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THE MAYOS.

The name of Mayo, so honoured in our profession to-day, has long held a distinguished place in the history of science. John Mayouwe, Mayow, or Mayo, one of the pioneers of physiology in the second half of the seventeenth century, died in 1679 at the age of 35; until the appearance of Priestley and Lavoisier there was no one worthy to take his place in the field of physiological chemistry. His memory is one of the glories of English medicine. He left no offspring, and we do not know whether any of the medical Mayos of the eighteenth and nineteenth centuries could claim to be his kin. It is a remarkable fact that of the fourteen Mayos commemorated in the *Dictionary of National Biography* six were medical men. Four belonged to an old Hertfordshire family, and of these two were physicians and one was a surgeon to the Middlesex Hospital, and the other, Thomas Mayo, was President of the Royal College of Physicians in the period 1857–62. Herbert Mayo, surgeon and physiologist, was a prominent figure a hundred years ago; he is remembered not only for his professional attainments, but for his success in a bitter controversy with Sir Charles Bell on the question of the nerve supply to the muscles of the face. The honoured name of Mayo was carried across the Atlantic by William Worrell Mayo, who, after receiving his medical education in Manchester, went as a pioneer into what was then the wilderness of Minnesota; there, in Rochester, he founded the St. Mary's Hospital, to the direction of which his two distinguished sons succeeded. It is unnecessary to dwell on the wonderful organization which has made the names of the brothers Mayo and their skill famous throughout the world. We learn with great pleasure that both of them, forsaking one of their own precedents, will visit Manchester next July to take part in the Annual Meeting of the British Medical Association. We venture to believe that William and Charles Mayo will receive not only a warm welcome from the Association, but all the honour which Manchester can pay to the celebrated sons of one of her own alumni.

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THE

PHILOSOPHY OF LIVING

BY

HERBERT MAYO F.R.S.

SENIOR SURGEON OF THE MIDDLESEX HOSPITAL

LONDON
JOHN W. PARKER WEST STRAND
M.DCCC.XXXVII

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PREFACE.

> "For though we Christians do continually aspire and pant after the Land of Promise; yet it will be a token of God's favour towards us, in our journeyings through the world's wilderness, to have our shoes and garments (I mean those of our frail bodies) little worn or impaired."—Bacon.

Such is the authority which may be adduced for considering the principles which contribute to the maintenance of health and the preservation of the body. The difficulty of treating this subject arises from its popular nature. There is a risk, on the one hand, of entering too deeply into physiology for the general reader, on the other, of being accounted superficial. Of the two evils, on the present occasion, the first appears to me the most to be shunned. A profound knowledge of physiology is only attainable through anatomy; and anatomical investigations are too repulsive in their nature,—however important as part of a professional education,—for general pursuit. Botany, chemistry, geology, each in its turn, has been the subject of popular interest and study; but physiology, except in connexion with a few striking discoveries, or a few practical applications of the science, appears to have little chance of engaging public attention.

An author on *Hygiène* must, therefore, be content to skim the surface of knowledge, if he desires his work to be read by those to whom it can convey information. The cream, however, is often on the surface: and I believe it to be generally true, that superficial books are the most useful. Such is my defence, if, in the attempt to suit this volume to unprofessional readers, I have rendered it too trivial and discursive. I may be permitted to add, that I should not have ventured upon a treatise of so popular a character, had I not already given evidence, in former publications, of having laboured at severer professional studies.

My object has been to bring together and to explain the rules which should guide us in respect to DIET, EXERCISE, SLEEP, BATHING, CLOTHING, CHOICE OF RESIDENCE. To these I have joined some observations respecting HEALTH OF MIND. For the maintenance, however, of health, both of mind and body, other physical rules must be attended to, which I have thought it best to exclude entirely from this treatise, and have put together in a separate volume, which will shortly be published*.

It only remains for me to beg the reader's indulgence for the omissions and errors which he may observe in the present essay, and to add a passage from Lord Bacon, the importance of the rules in which will render three, at least, of the following pages valuable, and to the purpose.

"There is a wisdom in this beyond the rules of physic: a man's own observation, what he finds good of and what he finds hurt of, is the best physic to preserve health. But it is a safer conclusion to say, This agreeth not well with me, therefore I will not continue it; than this, I find no offence of this, therefore I may use it. For strength of nature in youth passeth over many excesses, which are owing a man till his age. Discern of the coming-on of years, and think not to do the same things still; for age will not be defied. Beware of sudden change in any great point of diet, and if necessity enforce it, fit the rest to it. For it is a secret both in nature and state, that it is safer to change many things than one. Examine thy customs of diet, sleep, exercise, apparel, and the like; and try in anything thou shalt judge hurtful, to discontinue it by little and little; but so as if thou dost find any inconvenience by the change, thou come back to it again; for it is hard to distinguish that which is generally held good and wholesome, from that which is good particularly, and fit for thine own body. To be free-minded, and cheerfully-disposed at hours of meat, and of sleep, and of exercise, is one of the best precepts of long lasting.

---

* "Management of the Organs of Digestion, in Health and in Disease."

"As for the passions and studies of the mind, avoid envy, anxious fears, anger, fretting inwards, subtile and knotty inquisitions, joys and exhilarations in excess, sadness not communicated. Entertain hopes, mirth rather than joy, variety of delights rather than surfeit of them; wonder and admiration, and therefore novelties; studies that fill the mind with splendid and illustrious objects, as histories, fables, and contemplations of nature. * * * * * If you make physic too familiar, it will make no extraordinary effect when sickness cometh. I commend rather some diet for certain seasons, than frequent use of physic, except it be grown into a custom. For those diets alter the body more, and trouble it less. Despise no new accident in your body, but ask opinion of it. In sickness, respect health principally; and in health, action. For those that put their bodies to endure in health, may, in most sicknesses which are not very sharp, be cured only with diet and tendering. Celsus would never have spoken it as a physician, had he not been a wise man withal, when he giveth it for one of the great precepts of health and lasting, that a man do vary and interchange contraries, but with an inclination to the more benign extreme: use fasting and full eating, but rather full eating; watching and sleep, but rather sleep; sitting and exercise, but rather exercise; and the like. So shall nature be cherished, and yet taught masteries. Physicians are some of them so pleasing and conformable to the humours of the patient, as they press not the true cure of the disease; and some others are so regular in proceeding according to art for the disease, as they respect not sufficiently the condition of the patient. Take one of a middle temper; or, if it may not be found in one man, combine two of either sort; and forget not to call as well the best acquainted with your body, as the best reputed of for his faculty."

H. M.

19, George Street, Hanover Square,
March 10, 1837.

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ERRATA.

Page 66, line 30, *before* bread and water, *read* a diet of.
109, line 9, *for* closest, *read* closet.
119, line 24, *for* cubes, *read* pieces.
260, line 5, *for* graphic account, *read* enumeration.

ADDENDUM.

In page 201, the Author has recommended for weak eyes, glasses that appear gray, and are a diluted black. Mr. Dollond has since been kind enough, at the Author's request, to contrive a glass of a neutral tint, which likewise diminishes the glare of light, without sensibly imparting colour. Those whose eyes need this protection temporarily, will do well to try both kinds. For the weakest eyes, however, the shade of black is preferable.

" Doctor, no physicking. We are, as I already told you, a machine made to live. We are organized for that purpose, and such is our nature. Do not counteract the living principle. Let it alone; leave it the liberty of defending itself,—it will do better than your drugs."——The Emperor Napoleon.

THE

PHILOSOPHY OF LIVING.

INTRODUCTION.

DIVERSITIES OF CONSTITUTION.

As the present volume is intended to give an account of the influences which contribute to the Maintenance of Health, it may not be inappropriate to prefix to it an examination of the varieties of health; and to describe, introductorily, the most remarkable differences of constitution displayed by individuals, who are in the enjoyment of perfect health, or, more generally, who are not labouring under present disease. In medicine and surgery it is found to be of supreme importance to attend to many of the distinctions which this inquiry elicits. A thorough knowledge of the inward changes which constitute diseases, and a familiarity with their symptoms and ordinary progress, are of limited use to a physician, unless combined with a discrimination of the mental and physical peculiarities which individualize his patients. It is presumable that rules of *Hygiène* equally demand adaptation to particular cases, and the same general study of the varieties of the constitution of Man.

A subject of such extensive practical interest was not likely to escape the early attention of physicians. Accordingly, at the origin of medicine as a science, the leading facts of this branch of study were diligently and carefully noted. The subject has not, however, been followed out with the success that has attended other researches nearly allied to it. The distinctions which the Greek physicians observed, have indeed, as successive theories have risen and fallen, been made the subjects of different hypothetical explanations: but the essence of our knowledge remains nearly the same, and is not found to have undergone any important alteration in the writings or through the labours of modern physiologists.

The unprogressive state of this branch of physiological study is not attributable to want of cultivators. Many, especially during the last half century, have laboured to recast the theory of constitutional diversities, trying to base it upon new grounds, and to divest it of the vagueness which it has hitherto presented. The ill-success of these attempts appears to me to have been owing to inquirers having sought in the subject more than it contains, neglecting the observation of superficial but determinable differences, in the endeavour to establish profound and scientific, but unreal distinctions. It is possible, likewise, that some of the differences here alluded to may, in the end, be found not to deserve serious consideration; and to be as arbitrary, in relation to health, as the shape of the features, or trifling differences in stature; and to have an accidental and occasional association only with constitutional strength or weakness. The present essay may possibly, therefore, prove, as far as the first distinctions that I propose to draw are concerned, valueless, like many that have preceded it; and its fate may be the familiar one to be declared to consist of two parts, the true and the visionary; the true being knowledge in possession of every one; the visionary being the views of the author. Nevertheless, I think that I shall have succeeded in placing the subject in a more definite and practical train for inquiry and further elucidation than it has yet been left in.

Let me premise that there are certain leading constitutional differences, upon which I shall offer no preliminary remarks. These are the differences belonging to age and sex. Of these, I shall take for granted, on the part of the reader, so much knowledge as will enable him to see the reasons of the particular rules, which in the subsequent parts of this work will be laid down in reference to them.

But between individuals of the same sex and age there exists endless diversity. No two are exactly alike in person and in disposition; no two agree in constitution; no two have the springs of their physical powers tempered alike, so that under like circumstances their reaction shall be equal. And here, as commonly in Nature, there are no breaks and recommencements; in her infinite variety there are no abrupt transitions: the extreme diversities are united by the intervention of instances of every intermediate shade, and in which all the elements of difference are interwoven in every proportion and combination. To abstract and generalize these elements of difference, (begging the question that it is philosophical to attempt it,) is to destroy or to disregard individual resemblance. If the few distinctions are drawn that alone are strictly general, they precisely suit so few individual cases, as to appear at a first view practically unavailable. Nevertheless, it is such alone that I shall labour to establish,—the extreme and salient differences of the human constitution,—leaving the intervening ones, which form the mass, to be understood by calculating the proportions of each of the former which they contain.

The diversities of the human constitution (excluding from among their elements disease, but not the tendency to it,) may be referred to three natural divisions,—TEMPERAMENT, HABIT, DIATHESIS. By temperament I intend to express the ideas usually conveyed by the term; and in the use of the words habit and diathesis, it will be found that I only differ from custom in restricting each to one of several meanings, in which they have hitherto been indiscriminately employed.

I. TEMPERAMENT.

By temperaments are meant certain peculiarities of constitution, compatible with perfect health, and ordinary duration of existence; which are born with the individual, but are capable of being heightened or diminished through the influence of external circumstances; and which, when disease is excited in the frame, impart to it a bias.

The elements out of which the distinction of temperaments has been sought, are three: external physical character, mental disposition or cast of thought and temper, proclivity to certain forms of bodily disorder. Of these elements the least certain is mental disposition. The mind depends, for the manifestation of its powers, upon the brain, and every variety of brain is met with in every temperament. It is true, that independently of what appear to be the native force and constitution of the mind, a character of vivacity or sluggishness, of mutableness or constancy, and the like, appears to be superadded by temperament. But such modifications of character are not constant; and they are still but expressions of qualities of the brain.

Proclivity to disease becomes, on a different ground, an inadequate criterion of temperament; it requires fitting circumstances to develope it, and when it is indisputably manifested, the subject of it is already removed from the province which we are now considering.

The principal criterion of temperament is therefore to be sought in external physical appearance.

A great difficulty, however, presents itself *in limine*, to the employment of outward character, as the measure of temperament. The differences, which may be distinguished among Europeans, how are they to be traced, or their analogues to be recognised in the Negro or Chinese? Even for the inhabitants of the north and south of Europe, such a common criterion would be found frequently inadequate, and at fault. No remedy occurs to me for this, but to limit the scope of our inquiries, at first, to a single nation. If in one country certain principles of variety can be established, it will be less difficult afterwards to extend the same or parallel observations to others. My first object therefore will be to describe the differences of temperament which are displayed among our countrymen.

The leading varieties of temperament which are distinguishable in England, may be described as the *mixed* or *equal*, the *sanguine*, the *lymphatic*, the *bilious*, the *nervous*.

Some may think it would be more philosophical to consider those only as primary temperaments, which have an element in excess, and from the combinations of these to have deduced the rest. But the Greeks had their temperate temperament; and when there are four elements always co-existing, it is not illogical to treat as primary varieties their five simplest combinations, namely, one for the union of the four in equal proportions, and one for the predominance of each.

The reader is to bear in mind that for one instance that occurs exemplifying either of these varieties purely, there are forty-nine which are composite, combining one or more prominent characteristics of the others.

It is likewise to be understood that each temperament is more or less strongly modified by sex and age. Or, to state the difference relating to sex more justly, it should be affirmed that each temperament has a softer or rougher cast,—a masculine or feminine character,—which are commonly appropriately distributed to men and women; but not invariably. A temperament with a strong cast of effeminacy is sometimes met with in men; and a masculine quality in women. This error of cast of temperament leads to some curious results, when in excess, or combined with mental derangement*.

---

* James the First was singularly effeminate; he could not behold a drawn sword without shuddering; this and other traits in his character, exemplifying the distinction drawn in the text, are pointedly stated by D'Israeli, in his *Curiosities of Literature.*

1. *The mixed* or *equal temperament* is that in which no physical element predominates, in which the greatest soundness of constitution exists, or power of resisting the greatest variety of morbific impressions; and to which, as might be expected, the highest physical and mental developement is congenial. This temperament, in England, presents the following physical character. The eyes gray, or gray mingled with a shade of brown or blue. The hair soft, flowing, of different shades of brown, the eyes sometimes a deep blue, with dark eyebrows and hair, sometimes a dark hazel. The complexion in women almost fair with a colour either fixed, or changing. In men the complexion colouring only with exercise, otherwise not pale, but fresh, browning readily on exposure to the sun. The body capable of great endurance, naturally neither spare, nor large; not easily reduced to the former condition, nor prone, except in age, to become unwieldy; capable of the highest developement of muscular strength: in women often presenting the finest perfection of shape and figure.

The ordinary mental characteristics (if these remarks are not too fanciful) are a disposition grave but cheerful, often joined with a quick perception of humour, and touched with liveliness of fancy; the understanding often vigorous, the judgment sound; a character capable of great and continually renewed exertion.

Lord Bacon seems to have contemplated the prevalence of some such temperament as I have described under this head, when he speaks of "Eyes somewhat large and the circle inclined to greenness, senses not too quick, the pulse in youth slow, towards old age quicker," among the prognostics of long life.

2. *The sanguine temperament* is characterized by a fair complexion with colour, the eyes blue, the hair red, or brown with a shade of red or yellow, auburn or golden; in men the complexion ruddy, reddening upon exposure to the sun. The frame, with indulgence, liable to become large; with habits of bodily exercise, susceptible of the greatest muscular developement. The vascular system preponderating gives this temperament its character. The pulse is strong and often frequent, the circulation vigorous. In one of the greatest geniuses in his branch of art, that have adorned this country, in whose constitution the sanguine temperament prevails, the pulse, remarkable for strength and regularity, is rarely under a hundred, and after dinner commonly rises to a hundred and ten, or a hundred and twenty.

The mental features of the sanguine temperament are a disposition ardent, hasty, and impetuous; the spirits high and buoyant; a capacity for intellectual exertion for the strongest kind, or highest flight, but often capricious and ill-sustained: although excitable, this temperament is generally combined with less sensibility than the mixed, or the nervous. The morbid tendencies peculiar to the sanguine temperament are all inflammatory; reduction by bleeding is borne to a greater extent by persons of this temperament than by others.

3. *The lymphatic* [serous, pituitous, phlegmatic, or leucophlegmatic] *temperament* is characterized physically by a light complexion, inclined to white rather than fair, the hair white or sandy, the eyes a blueish gray, the eyebrows and eyelashes inclined to white. The circulation tranquil or languid. The frame often large; the muscles large, but deficient in strength; the person disposed to fulness. The terms by which the temperament is designated are to be viewed as entirely hypothetical.

It has been already observed that every variety of mind may be combined with every temperament. But the prevalent disposition of this temperament is towards indolence and inexertion: the temper unmoved and impassive.

The diseases to which persons of this temperament are characteristically obnoxious, are indigestion, and such as flow from want of power of the circulation, passive enlargement of the heart, chronic glandular tumours, a varicose state of the veins, &c. Persons of this temperament are inferior in stamina to those of the mixed, the sanguine, or the melancholic; and their health is liable to be injured by depletion.

4. *The bilious temperament* derives its physical character from the redundancy of bile in the system. Hence the complexion is dark, with a tinge of yellow; the eyes are dark; the hair black, strong, and coarse, either lank and straight, or crisp and curling: the circulation is slow, and the quantity of blood less than in the sanguine temperament: the frame is spare; the temper serious, the feelings not excitable.

The common form of indisposition is bilious disorder, headach, loss of appetite, nausea, bile upon the stomach, supervening upon slight causes, physical or mental. The constitutional stamina are strong, and not easily exhausted. Depletion by bleeding is not prejudicial; but the effect required is generally obtained by a moderate abstraction of blood. The character naturally grave, and although strong, yet without elasticity, is liable to fall into melancholy.

There are two varieties of the bilious temperament, which I am induced to mention from the familiarity of the terms which express them. Neither, however, as I shall define them, are frequent varieties in this country. One is the choleric, the other the melancholic temperament. The former combines with the bilious, a larger dose of the nervous temperament; the latter, of the sanguine. The former, with a complexion like the bilious, displays greater irritability and less strength of fibre. The latter, distinguished by a complexion darker but fresher, the veins large, the pulse strong but slow, is characterized by its capability of physical endurance, and by the mental energy frequently co-existing with it.

5. *The nervous temperament.* The sanguine, the phlegmatic, the bilious temperaments, are distinguishable by external appearance; and if the mixed or equal temperament is not equally salient, it requires no length of observation to determine its existence by outward physical signs alone. The marks of the nervous temperament are less constant and obvious. This temperament, the offspring at once and parent of refinement, is a modification of each or either of the rest, as the mixed consists of the predominant characteristics of the other four, attempered and subdued. The nervous temperament commonly presents the general outward habitudes of the mixed, next in frequency of the sanguine, mingling with each an air of delicacy and grace not its own, joined with a high tone of feeling, often uniting a natural justness of perception.

The circulation in persons of the nervous temperament is easily excitable, but wants power. The pulse is generally frequent, without strength: the action of the heart is unequal, and easily affected by accidental circumstances. The strength and weakness of such persons equally appear greater than they are. The tendency of this temperament is to exhaust itself, and to use its resources with waste of nervous power.

Lowering such a temperament by depletion is injurious. A remark, which is of the more importance, that the state to which the nervous temperament is reduced, when overwrought, often closely resembles threatenings of disease in vital organs, that in other temperaments are relieved by bleeding. The importance of the occasion leads me to give instances in exemplification of what I have advanced.

A gentleman with whom I am acquainted, an eminent diplomatist, is of the nervous temperament. He suffered some years ago with palpitation of the heart, which was nervous. A celebrated physician, lately deceased, attended him, and had him bled on two or three occasions;—the treatment rendered him worse, and a different plan was adopted. His physician afterwards candidly advised him, whatever he did on the recurrence of these symptoms, not to be again bled.

Another gentleman of my acquaintance, who displays the nervous form of a mixed temperament, with excellent stamina, a pulse slow and not excitable, about the middle period of life, when otherwise in health, became subject to nervous feelings, the most serious of which gave him the idea of sudden and imminent dissolution. He would occasionally wake in alarm with this impression, the feeling producing which was liable to recur during the day. Dr. Baillie told him not to mind these sensations, which resulted from temperament; and which, as he advanced in life, would leave him. They have done so.

Another gentleman, of the same temperament, with whom I am acquainted, on exceeding his strength by combining mental exertion and excitement with indulgence in the pleasures of the table, became the subject of the following symptoms:— During the fore-part of the day, his vision was occasionally uncertain, as if the scene he looked upon was unreal; and in walking, he experienced a strong sense of insecurity and unsteadiness; stimulants temporarily removed these feelings, and quiet and abstemiousness cured them. At the worst, these symptoms were combined with every form of visual disturbance. Sometimes he only saw the right half, sometimes the left half only of objects; and this with both eyes; sometimes the centre only of objects, sometimes their circumference alone.

The nervous temperament in women is the source of hysteria, with all the variety of feature which it presents; whether that of shrieking, and sobbing, and difficulty of respiration, or temporary insensibility, or blindness, which will last for months, or spasmodic contraction of a single joint, or pain and tenderness and awkward motion of a joint, or numbness and weakness of the limbs,—the hip and knee-joints, and the legs, being the parts commonly affected, often with the most delusive character of structural disease.

The nervous temperament gives rise to a form of melancholy, a case of which I will mention in concluding these observations. It arose in a lowered tone of the nerves, and was cured by tonics. The lady, who was latterly under my own care, is now perfectly well.

At the age of sixteen, she became liable to what she termed blind headachs. These seizures began with indistinct vision of the middle of objects; this partial blindness would last half an hour, and then go off, leaving intolerable pain at the top of the head. At the age of thirty-five, she gradually fell into depression of spirits, and terrors of she knew not what, and impulses towards ridiculous and extravagant actions, which she felt barely capable of resisting. When these impressions were not upon her, she was a high-spirited, intelligent woman. The remedies which had been tried were blisters, cupping, and aperient medicine. These means lowered her strength, and increased the depression of her spirits. The treatment which restored her was a nourishing diet and tonics; and of tonics principally the carbonate of iron, which had the most remarkable effect, as I ascertained to a demonstration, by alternately intermitting the remedy, and by lessening and increasing the dose.

If one should attempt to describe the prevailing features of the inhabitants of the continent of Europe by the proportions which they display of the temperaments above described, the following, perhaps, might come near to their average of physical character.

The Italians, as compared with the English, are free from any share of the lymphatic temperament. Their olive or lurid complexion is based on the bilious or melancholic, with which their energetic feelings correspond; their quick sensibility and vivacity indicate a considerable participation in the nervous temperament.

The Spaniards have probably less of the nervous temperament, in other respects agreeing with the Italians.

The Germans, with their inertia of industry, and untiring labour, reflective, imaginative, rather than of deep or quick sensibility, exhibit in their minds, as in their persons, the conjunction of the lymphatic and sanguineous temperaments.

The Dutch present the nearest approach to the lymphatic temperament. Besides the pure lymphatic, however, they often exhibit the same character in two combinations,—the one with the sanguine, the other with the choleric.

The French have little of the phlegmatic temperament; the nervous, the choleric, the sanguine, combine to form the leading elements of their physical and mental constitutions.

The citizens of the United States come nearest to the English; but they lack of the mixed or equal temperament, part of its proportion of the nervous.

II. Habit.

Habits are conditions of the body, brought on by manner of living; which are favoured by temperament, one temperament disposing towards one habit of body, another to another; but which are distinct from temperament; which again dispose the frame to disease, but that general, not specific; and which, though they lead to disease, and aggravate it when present, are distinct from disease.

The frame may, for example, be either full or spare. Indolence and indulgence may give volume and mass of fluid and solid to the same body, which, under active exertion, and in the midst of hardship and privation, would have been spare and extenuated.

Independently, again, of fulness and spareness, and combined with either, the body may exhibit either a sthenic* or a relaxed condition. The body may be either full and sthenic, or full and relaxed; or spare and sthenic, or spare and relaxed.

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* Σθενος, strength. *Sthenic,* strong, rigid.

The term *plethora* is commonly used to express the full and sthenic condition of the frame; it is most natural to the sanguine temperament, but often occurs in the mixed. Cribb, the celebrated pugilist, as I recollect to have seen him a few years ago, well exemplified this condition in a person of the latter physical character. The person large, the countenance full and disposed to general colour, darkened to lividity on stooping; the breath short upon exertion. In such persons the body and mind are often indolent; the sleep is long and profound, and not proportionately refreshing. The prominent feature is excess in the quantity of the circulation, leading to hemorrhages, inflammations, apoplexy. A common spontaneous mode of relief consists in severe but regular attacks of gout. The proper remedy is abstinence and regular exercise, not suddenly entered on, but gradually adopted.

When plethora occurs in the bilious temperament, which is prone to spareness of habit, it does not show itself by material increase of volume in the frame; but the pulse is full and strong, the eye suffused, the complexion darker, and headach and bilious disorder more frequently experienced.

The pulse, however, it is to be remarked, is not a certain measure of this condition of the system. Sooner or later the organs of the circulation are liable to be obstructed by the quantity of fluid they contain, the heart to be unequal to, and to give way from the task; the pulse to be slow, laboured, unequal, rising upon depletion.

Fulness with relaxation ordinarily shows itself by redundancy of fat. The circulation is not loaded, for the superfluous nutriment has this ready vent. Accordingly, the system will generally ill bear bleeding in persons of this habit; they are full but weak. Lowering in any mode, except by exercise, (or unless their diet has previously been immoderate,) endangers their health. The disposition to form fat established, is disposed to perpetuate itself, and so draws upon the circulation impoverished by injudicious means of reduction. No change in the constitution is to be viewed with more suspicion than sudden and rapid increase in fat, between twenty and forty years of age. Such an increase of the frame, unless it happen to be reduced by altered habits of living, or some spontaneous change in the nutrition of the system, commonly leads to febrile or inflammatory illness.

It is to be observed that fatness, though commonly the sign of a relaxed habit, yet not unfrequently co-exists with plethora. It again occasionally happens that fulness with relaxation, even in a sanguine temperament, is not attended with considerable obesity; the alternative may be spontaneous, profuse, and exhausting perspiration.

Fulness in the lymphatic temperament takes the form of relaxation. Persons of this temperament often spread and become large.

Lord Bacon observes, "corpulency in youth foreshows a short life; in age it is a thing more indifferent." In youth it marks a disposition to fulness of habit, and often of co-existent weakness of stamina. In advanced life it measures only the disproportion between exercise and diet, and is often a salutary vent for excess of the latter. Nevertheless, it is a better sign, when, as age advances, the frame decreases in fulness.

A spare habit, maintained by intellectual and bodily activity, short of over-fatigue and exhaustion, constitutes the wholesomest condition of the economy. It is met with in persons of the mixed temperament in its most faultless character. It is seen in the sanguine and the bilious, but then is less exempt from the diseases to which each of the latter is prone.

A spare habit with relaxation is the result of excess and exhaustion, of anxiety, mental depression, and distress. It is the measure of a weakness of the frame, which, unless the cause provoking it is removed, and the system allowed to recruit itself, threatens disease of the brain, of the heart, and of the lungs; palsy, angina, consumption.

III. DIATHESIS.

Two principles have been already adverted to by which mental and physical constitution are modified. One, *hereditary transmission*, which determines temperament. The other, the *influence of mode of living*, which determines habit. Either of these principles, again, may be the source of disease. Many persons are born with an hereditary disposition to disease. In some the disposition prevails in a single organ. Either the brain, or the stomach, or a sentient organ, or any other, may be hereditarily weak. Thus a tendency to insanity is found in one individual, a weak digestion in another, early failure of the teeth in a third, a tendency to become blind in a fourth, to deafness in a fifth.

But there are certain morbid dispositions which are general, and seem rooted, not in one organ of the body, but in the entire frame; which may not only, being inherited, be heightened by accidental circumstances, but possibly may be induced by a concurrence of causes in a previously sound constitution. These dispositions to general disease, whether founded in original and inherited weakness or depravation of the system, or brought on by unwholesome living, constitute *diathesis*. They are distinguished from the diseases to which they lead, by co-existing for a part or the whole of life with seeming health. Where they are hereditary, the infant may be born with every appearance of health: but after a longer or shorter interval, the disease of which the system contained the germs manifests itself, partially or universally, mildly or severely.

There are three diatheses,—that of gout, the strumous, and the cancerous.

1. *The Gouty diathesis.*—This disposition does not manifest itself by any unvarying outward signs.

Acidity at the stomach, flatulence, wandering pains in the toe, instep, ancle, in the thumb and wrist, are premonitory symptoms of the disease, not elements of the diathesis.

The gouty diathesis generally takes a character from the temperament and habit of body. In persons of the sanguineous or mixed temperament, especially if plethoric, gout appears in its regular form; which consists of attacks of pain, heat, redness of one of the smaller joints, generally preceded by attacks of indigestion. The joints that are frequently attacked become the seat of chalk-stones. Gout, having an inflammatory character, may determine itself, in full habits, to almost every organ,—the eyes, the throat, the lungs, for instance; and leaving suddenly the part attacked, may appear immediately, or after an interval, in the more customary situations.

Of the irregular forms of gout, one is remarkable for its liability to alternate, in any habit, with regular gout: this is gout in the stomach. A gentleman's butler told me that he often had attacks of gout in the foot, which he had hitherto treated by placing the foot under the pump, and letting cold water flow upon it, till the pain abated. On most occasions the remedy had been directly successful; on others its use had been followed by pain at the stomach, nausea, and vomiting. These symptoms he had removed by drinking brandy.

The other irregular forms of gout are most frequently met with in temperaments not participating in the sanguine character, or the plethoric habit. The following are instances which have fallen under my own observation of some of its forms.

A gentleman of the mixed temperament, but inclined to the nervous, of a spare habit, abstemious in diet, and used to bodily exertion, in whose family there is gout, frequently suffered severe attacks of headach, which lasted several days, and completely subdued and overwhelmed his mind while they lasted. On one occasion, the summer before last, he was seized with a sudden and violent pain in the side, and inability to breathe,—he was largely bled; after some hours, the pain, which had been mitigated by the bleeding, left him suddenly. This happened in the north of England. On coming to London the following winter, after a few days' indisposition, he was taken, for the first time in his life, with regular gout in one instep.

A gentleman of a fuller habit, but of the nervous temperament, and who had indulged to a certain extent in free living, at the age of forty relinquished the medical profession, and habits of active exercise in country practice. After a time, without becoming larger in person, he became liable to threatenings of head-disorder, to sudden vertigo and giddiness, and headach, with wandering pains in the foot and instep; which, with other circumstances, established to the satisfaction of his medical friends that the seizures were gout.

A gentleman asked my advice for what he supposed a sprained ancle; the foot was swollen and red, and was comfortable only when hanging down, as when he sat in a chair;—the attack was gout. He did not remember the occasion on which his ancle had been sprained, but he concluded that he must have met with such an accident. For many years he had laboured under distressing indigestion; and for the immediately preceding years he had suffered under one single local pain, which although nothing had even temporarily removed, had been occasionally mitigated. The local pain I presume to have been irregular gout.

A gentleman of a temperament blending the nervous with the bilious, has laboured for thirty years under what he terms spasmodic gout. The disorder consists in sudden pain extending along the outside of the leg in violent paroxysms, stretching downwards to the toe, upwards to the loins, side and neck, often combined with a sense of heat in the crown of the head, mental hurry and confusion. The limb, when seized with pain, cannot bear a slight touch, but is the better for being suddenly and strongly grasped. Colchicum has always mitigated the attacks when most frequent and severe; and a course of medicine, principally of a tonic nature, which has now for some time been pursued, promises to reduce the complaint to its normal character.

I select the preceding instances, because they have fallen under my personal observation. The subject is one of the same kind of importance, as a popular study, with the disorders already adverted to, which spring up as the natural produce of the nervous temperament. It deserves to be generally known that almost every symptom, from an eruption on the skin, to threatening apoplexy, may be gout.

It has been observed that those of a plethoric habit are most liable to regular gout, whether the diathesis leading to it has been derived from inheritance, or has been produced by indulgence. The proper management of the diathesis in such habits, to be pursued in the intervals of the fits, is abstinence and exercise. When gout attacks persons of a relaxed habit and advanced in years, wine is often a necessary cordial, and the use of it may require to be continued even during the presence of the fit. The most troublesome gout is that which occurs by force of hereditary transmission in persons who are temperate. They often suffer severely with the disease; and their best hope is to escape its anomalous forms, at the expense of the recurrence of regular seizures.

2. *The Strumous* diathesis* displays itself under two different and opposite physical characters.

In one, and the more frequent variety, the child presents unusual delicacy; the skin is clear, fine, and transparent; the frame slight; the mind quick, forward, intelligent, touched with a high degree of sensibility and gentleness; with this the skin, for the most part, remarkably fair, the veins showing through it; the cheek with a delicate but brilliant colour: the upper lip is commonly full; and, as another trivial peculiarity, the ends of the fingers are observed to be broad, and the nails bend over and are convex at their extremities. With the same character of delicacy, a dark transparent skin and dark eyes are occasionally joined, equally marking the strumous diathesis; the white part of the eye, glistening and pearl-coloured, has a lustrous appearance; the mind is quick and intelligent, as in the first variety.

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* Struma; *struere,* to build; from the tumours which it causes. Syn. *scrofula.*

The opposite form of the strumous diathesis presents a thick skin, pale or dark; the eyes gray or brown; the mind sluggish; and the perceptions blunt and slow. In this variety softening of the bones, or deformity from rickets, is often met with. Sometimes without deformity, when grown up, the frame is stunted, the head large; in childhood the features are often unpleasing, unequal; the ears large, the eyebrows thick, the eyes like an adult's, but dull and inexpressive.

Children in whom the diathesis is strong, do not fail to display early threatenings of strumous disease, either in a weak digestion, furred tongue, and tumid stomach, or in chronic inflammation of the eyes, or in ulcers of the eyelids, or behind the ears, or in glandular swellings in the neck.

From birth to advanced age, persons of the strumous diathesis are in danger of scrofula developing itself in one or more organs or textures of the frame. In early childhood the glandular system and the bones, from boyhood to the age of five-and-twenty the lungs, are the parts the most liable to be invaded. But every part of the frame, from the integument to the centre, at every age, may fall into strumous action. From the age of thirty upwards, the morbid disposition declines in strength; it remains liable, nevertheless, to be invigorated by every accident of life that tends to debilitate the system.

It is in childhood and youth, when the frame is expanding, and growth in progress, that the diathesis has the greatest force. The causes which heighten it and excite scrofulous disease, are, insufficient or unwholesome nutriment, and exposure to cold and damp. The injudicious management of the food of weakly children, which is next to universal, concurs with the vicissitudes peculiar to our climate to render scrofula rife in this country. But with care and observation, the diet of a child may be accurately suited to its wants, and to the powers of its digestion; and the effects of our climate may be mitigated by avoiding exposure to its inclemency, and by clothing, or by temporarily quitting it for a warmer. Upon these subjects, some directions will be given in the subsequent chapters, under the heads of Diet, Clothing, Air.

Where the strumous diathesis is forcible, it betrays itself by the external features which have been described. Where it is slight, some milder form of scrofulous action often gives the first warning of danger. The means of exploration and our knowledge of pathological anatomy are now so much enlarged, that, when suspicion is awakened, it is generally possible to determine whether or not the affection already exists in the form of disease.

A moral feature, peculiar to this diathesis, is a certain elasticity of spirits, and a confidence against the mortal disease which threatens, that contributes, perhaps, to retard its inroads.

3. *The Cancerous diathesis.*

The wards in the Middlesex Hospital, endowed by the beneficence of Mr. Whitbread and of Mrs. Stafford, for the treatment of patients afflicted with cancer, have placed within my reach, as surgeon to that institution, considerable opportunities of studying this disease. The following are the general conclusions which I have formed respecting the *disposition* to it.

The cancerous diathesis is probably always present from birth, but the disease much oftener occurs in persons whose parents have not had it, than the reverse. The diathesis is liable to be brought into action at any period of life, from childhood to old age. It rarely breaks into disease before the age of forty, and most frequently between forty and sixty: but I have seen visceral cancer at twelve, and glandular cancer at sixteen.

The causes which mature the diathesis, or cause it to ripen into disease, are frequently mechanical, such as blows accidentally received. The use of parts, more than their disuse, renders them susceptible of cancer. Mental distress and anxiety promote its occurrence.

There is no external physical character which distinguishes the cancerous diathesis. I have seen the disease manifest itself in persons of every temperament. But I think that those of a light complexion are less frequently attacked with cancer than those whose skin is darker;—dark eyebrows, and gray eyes, with an inner circle of hazel, and dark-brown hair, are perhaps the commonest features.

It might be said, with an appearance of truth, that the mental character of the cancerous diathesis is depression and despondency. But this feature is the effect of the deplorable nature of the disease, not part of the constitution, which originates it. The patient views her probable fate with sad apprehension, that casts a melancholy shade over every thought. But the reality is often not so severe as the dreaded suffering. The disease always admits of great palliation, and sometimes has been successfully removed, and has never returned.

The disease is at first one, not of weakness, but rather of power; and its early progress is accordingly checked by the use of leeches, issues, iodine, sometimes even by mercury.

Chapter I.

OF DIET.

Dr. Arnott gives the following amusing summary of the powers of the steam-engine, and of the objects upon which they have been employed.

"In its present perfect state, the steam-engine appears a thing almost endowed with intelligence. It regulates with perfect accuracy and uniformity the number of its strokes in a given time, and counts and records them moreover, to tell how much work it has done, as a clock records the beats of its pendulum; it regulates the quantity of steam admitted to work, the briskness of the fire, the supply of water to the boiler, the supply of coals to the fire; it opens and shuts its valves with absolute precision as to time and manner;—it oils its joints; it takes out any air that may accidentally enter any part that should be vacuous: and when anything goes wrong, which it cannot of itself rectify, it warns its attendants by ringing a bell;—yet with all these talents, and even when possessing the power of a hundred horses, it is obedient to the hand of a child:—it never tires, and wants no sleep; it is not subject to malady, when originally well made; and only refuses to work, when worn out with age; it is equally active in all climates, and will do work of any kind;—it is a water-pumper, a miner, a sailor, a cotton-spinner, a weaver, a blacksmith, a miller, &c.; and a small engine in the character of a steam-pony may be seen dragging after it on a railroad a hundred tons of merchandise, or a regiment of soldiers, with greater speed than that of our fleetest coaches. It is the king of machines, and a permanent realization of the genii of eastern fable, whose supernatural powers were occasionally at the command of man."

In order, however, that the steam-engine may perform these wonders, and work in any of the capacities which have been enumerated, two things are necessary. The engine must be fed; and as its parts become worn by use, they must be repaired. It must be supplied with coal, wood, charcoal, or other combustible matter, and water, which it converts into power; and when the machinery is injured, what is imperfect must be changed and replaced.

The machinery of the animal frame works under the same conditions. In order that it may energize, it must have food, and that it may not sensibly be deteriorated by use, it must undergo constant repairs. But there is this difference in the two cases. In the animal frame, the source both of its energies and of its structural restoration is one and the same. Its food furnishes both. The blood, which is formed from our food, flowing to the brain, and the muscles, and the stomach, not merely maintains their power, but in addition carries to the same parts, and to all the rest, the materials of their growth and renovation.

The supply of food to the steam-engine, has one purpose only to effect. It is, again, administered with absolute precision as to time and quantity; for it is meted out by those who understand the construction and working of the machinery, who know its wants exactly, and have no bias from prejudice or inclination to supply them otherwise than with rigorous exactness.

The food of human beings, more complicated in its objects, is meted out under much less favourable circumstances. The party who apportions it, for the most part, does not understand the action or the wants of the machine which he undertakes to supply; and what is more, for a long period is not only incurious on the subject, but often disposed to repel any information which may fall in his way. His motive for conveying aliment into his inside is of a totally different complexion to a calculated forethought of the needs of his economy: his exclusive object is to please two senses, and to gratify two appetites;—perhaps he besides takes delight in the whirl into which the machinery is thrown by excess, that fills him with giddy transport, while it endangers and undermines his existence. Well, indeed, may Dr. Beaumont say, "In the present state of civilized society, with the provocatives of the culinary art, and the incentives of highly-seasoned food, brandy, and wines, the temptations to excess in the indulgence of the table are rather too strong to be resisted by poor human nature."

I shall endeavour, in the present chapter, to explain the principles by which our diet should be regulated. Accordingly, I shall treat—of the nature of digestion;—of the nature of the various substances used as food;—of the qualities which render food wholesome and nutritive;—of the circumstances which strengthen or weaken digestion; —of rules for the frequency, quality, and quantity of our meals, adapted to different periods of life.

It is not the young and the healthy who will profit by these remarks. But every one who has reached the middle of life must have had occasion to observe how much his comfort and his powers of exertion depend upon the state of his stomach, and will have lost some of his original indifference to rules of diet. Such rules must especially interest those, who have the care of others,—of children with delicate health,—of the aged, who have ceased to exert their former care and observation of themselves. And if the principles have already been laid down by many writers, no one, it is probable, can attentively reconsider this subject, without seeing some of its bearings more justly and usefully than his predecessors have done.

I. DIGESTION.

DIGESTION is the commencement of assimilation, or of that process by which, in animals, their food is by successive mutations converted into a liquid, that is to circulate as a living and vitalizing agent through their frame.

In human beings, assimilation comprises the following steps. The solid food is bruised in the mouth, and mixed with the saliva; it is then swallowed, and conveyed along the œsophagus into the stomach, where it is altered into an uniform pulpy mass, termed *chyme**; from the stomach it passes into the small intestines, where it is mixed with the bile and other fluids, which cause the chyle† or recrementitious part to separate from it: the chyle is absorbed by the lacteals, and transmitted by them to the veins; mingling with the veins, the chyle is then passed through the vessels of the lungs, and aërated. The process of assimilation is then complete, and the blood so formed from the food is fit to sustain life.

Of these changes, there is one, which in a popular treatise like the present, exclusively merits attention. This is the alteration which the food undergoes in the stomach:—its conversion into chyme. Mr. Abernethy emphatically called this digestion; that is to say, he restricted the term digestion to this function. What precedes this change is mechanical, and a mechanical substitute may be found for it. The steps in assimilation which follow this change, if it has been perfectly executed, and the meal converted into proper chyme, are unfelt by us, executed independently of volition, and certain, if the system is in health, to be accomplished properly.

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* Chyme, χυειν, *fundere*, a fusion.

† Chyle, χυλος, a juice, or liquid.

The stomach is the seat of hunger; we take food to allay its cravings, which are found to be equally appeased, whether the food is swallowed in the ordinary manner, or directly introduced into the organ. This fact was established by experiments in the case of Alexis St. Martin, of which Dr. Beaumont availed himself with so much industry and judgment. A permanent aperture had been made into this person's stomach by a gunshot wound in the side, which allowed its interior to be seen, its contents to be taken out and examined, and foreign matters to be directly conveyed into it. The following are among the experiments adverted to.

"To ascertain whether the sense of hunger would be allayed without the food being passed through the œsophagus, St. Martin fasted from breakfast-time till four o'clock, P.M., and became quite hungry. I then put in at the aperture, three and a half drachms of lean boiled beef. The sense of hunger immediately subsided, and stopped the croaking noise caused by the motion of the air in the stomach and the intestines, peculiar to him since the wound, and almost always observed when the stomach is empty.

"At one o'clock, another day, St. Martin complaining of being quite hungry, I put into the stomach, at the aperture, twelve raw oysters, more than middling size. The sensation was allayed, and the appetite satisfied, the same as if swallowed."

Consistently with these curious facts, it is well known that the natural disposition of a very hungry person is to chew hastily and imperfectly, and to bolt his food. He is not satisfied till the food reaches his stomach. Food, however, when insufficiently masticated, and swallowed in large and hard masses, is liable to injure the œsophagus in going down, and when it reaches the stomach, is difficult of digestion. One purpose of the senses of taste and flavour which we enjoy, is to induce us to continue comminuting the food in the mouth, and bruising it as long as its taste and flavour last; while we are gratifying these senses, the food acquires the requisite consistence for easy swallowing and easy digestion. The time gained by this process prevents the stomach being too rapidly filled, and allows the appetite to be satiated before the stomach is overloaded.

The substances introduced into the stomach are in reference to their consistence either innutritious liquids, or liquids with food mixed, or solids. The first are quickly absorbed and carried out of the stomach; the second undergo a separation of the liquid; after which the solider part, like ordinary solid food, is digested.

The process of digestion is strictly chemical. It is the result of the action of a solvent fluid upon the aliment, and takes place almost equally well without as within the body, if the proper temperature is maintained.

The solvent fluid is poured out by the lining membrane of the stomach, as the perspiration pours off the surface of the body. It is called the *gastric** juice. It consists of water holding in solution free muriatic and acetic acids, phosphates and muriates with bases of potassa and soda, magnesia and lime, and an animal matter soluble in cold water, but insoluble in hot. It is clear and transparent, inodorous, a little saltish, and very perceptibly acid. It does not exist constantly, or accumulate in the stomach: but it is only secreted when wanted, or when the stomach is excited by the introduction of new matter into it.

The solvent power of the gastric juice out of the body was ascertained by Spallanzani, and Mr. Hunter discovered the remarkable phenomenon, that it would even digest, after death, the stomach which formed it. Dr. Beaumont, by many experiments, has confirmed the conclusions of Spallanzani. In some of the most valuable which he narrates, the same kind of meal was observed simultaneously undergoing digestion in the stomach, and in a phial of gastric juice obtained at the same time from the same stomach, and placed in a saucepan of water kept at the temperature of 100°. "The effect of the gastric juice on the piece of meat introduced into the stomach, was exactly similar to that in the phial, only more rapid after the first half hour, and sooner completed. Digestion commenced on, and was confined to, the surface in both situations. Agitation accelerated the solution in the phial, by removing the coat that was digested on the surface, enveloping the remainder of the meat in the gastric juice, and giving the fluid access to the undigested portion."

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* *Γαστηρ*, the stomach; gastric, belonging to the stomach.

The dissolved food, or the chyme, has the appearance of a thick homogeneous liquid, the colour of which partakes slightly of the colour of the food eaten. It is always of a lightish or grayish colour; varying in its shade and appearance from that of cream, to a grayish or dark-coloured gruel. Chyme from butter, fat meats, oil, resembles rich cream. All chyme is acid.

The perfectness of digestion (the food being digestible, and the stomach in health,) is dependent on the quantity of the gastric juice: if the quantity of the latter is proportionate to the meal which has been taken, the whole is changed into chyme. If the quantity of gastric juice is insufficient, a residue of undigested food remains in the stomach, and becomes a source of irritation and derangement of function. It is *not necessary* that the stomach should be emptied of one meal before another is introduced into it. The presence of a second meal, crude and fresh, does not necessarily disturb the digestion of the first. If the stomach is in full vigour, and can furnish the absolute quantity of gastric juice required for both, both meals will undergo together harmonious digestion.

II. Of Food.

Our food, it has been already remarked, consists of solid and liquid,—the former intended to be changed into chyme, the latter to be absorbed at once, and carried into the circulation, to make up for the waste of fluids which continually takes place. The distinction, however, is not a rigorous one. The food which we introduce into the stomach, is a very soft and moist solid, either from its own nature or from having been mixed with the saliva or other liquids; and the liquid which we drink for the primary object of allaying thirst, is often qualified by the addition of nutritive matter, or of some stimulating principle.

The substances which we consume as food are borrowed from the animal or vegetable kingdoms.

Their essential ingredients are certain chemical principles, fibrin, albumen, gelatin, oil, gluten, sugar, singly or in combination. Different as are these elements, it is probable, that the ultimate principle of nutriment is always the same, from whatever source obtained. It was said by Hippocrates that there are many kinds of aliment, but that there is at the same time but one aliment. Nothing has been proved in modern physiology or chemistry to invalidate this opinion.

Dr. Franklin told Dr. Stark that when a journeyman printer, he lived for a fortnight on bread and water, at the rate of ten-pennyworth of bread per week, and that he found himself stout and hearty with this diet.

Sir John Pringle told the same author that he knew a lady then ninety years of age, who ate only the pure fat of meat.

An Englishman supposes that wheaten bread and a large proportion of animal food are necessary for strength. A labouring Irishman or Scotchman would probably stand up for the excellence of a small portion of animal food with plenty of potatoes and oatmeal. The Laplanders are a meagre race living exclusively on animal food: the Hindoos, a fine race of men, feed on vegetables alone.

Facts so opposite, while they strengthen the original conclusion of Hippocrates, do not render the analysis of the *materia alimentaria* the less interesting or important. It is certain that if all nourishment be one, it yet may be obtained from some sources with greater facility, and less exhaustion of the digestive powers, than from others; and that, although the stomach may accommodate itself, under the stern discipline of necessity, to less wholesome diet, and nations survive that use it, that population is, nevertheless, checked, and life abbreviated, through the influence of this cause. There are two modes of pursuing this inquiry; the first, being the comparison as to longevity and physical strength of the inhabitants of those countries in which opposite kinds of food are used; the second, the collation of the observations which, under different circumstances, have been made in our own country, as to the effects of different modes of diet on individuals. On the present occasion, I shall enter upon the second branch alone of this inquiry. We may commence with examining the nature of the different substances which we consume as food, and their properties in reference to digestion, and the nourishment of the frame.

The following is the classification of the articles of food, given by Dr. Paris, in his excellent Treatise on Diet.

I. FIBRINOUS ALIMENTS. Comprehending the flesh and blood of various animals, especially such as have arrived at puberty: venison, beef, mutton, hare.

II. ALBUMINOUS. Eggs: certain animal matter.

III. Gelatinous Aliments. The flesh of young animals: veal, chickens, calf's-foot, certain fishes.

IV. Fatty and Oily Aliments. Animal fats, oils, and butter: cocoa, &c.: ducks, pork, geese, eels, &c.

V. Caseous Aliments. The different kinds of milk, cheese, &c.

VI. Farinaceous Aliments. Wheat, barley, oats, rice, potato, sago, arrow-root, &c.

VII. Mucilaginous Aliments. Carrots, turnips, asparagus, cabbage, &c.

VIII. Sweet Aliments. The different kinds of sugar, figs, dates, &c.: carrots.

IX. Acidulous Aliments. Oranges, apples, and other acescent fruits.

Condiments consist of salt, vinegar, pepper, and the like; which will afterwards be more particularly adverted to.

Our drinks consist,

I. Of water.

II. Of vegetable infusions.

III. Of fermented liquors, wine, beer, &c.

IV. Of ardent spirits.

Three properties must be combined in food to render it wholesome, and adequate to maintain the vigour of the stomach and of the system; these are, digestibility, nutritiveness, and a certain power of exciting or stimulating the stomach.

I have placed *digestibleness* first, as it is evidently the essential condition. However nutritive the food, if the stomach cannot digest it, it cannot go to nourishment; nor is this merely a negative result. Food that is not digested produces disorder of the stomach, and derangement of the entire frame. If a person convalescent from protracted and exhausting illness, on the first return of appetite, should eat a meal of beef-steaks and porter, instead of his being strengthened, vomiting, derangement of the circulation, and a relapse into illness, would be the consequences. If in health a person consumes a meal, part of which is not digested, he is liable to parallel consequences, sometimes trivial, but to which it has happened that life has been the forfeit.

Some foods are naturally, that is, chemically, slower of digestion than others; vegetable food than animal food, oily substances than those which are not so, gelatinous and albuminous than fibrinous. But a great deal depends upon the mechanical condition of the aliment. If it is tender, of a loose texture, easily divisible, the gastric juice, aided by the motion of the stomach, quickly penetrates and rapidly chymifies it. When, on the contrary, food is hard and close-grained, it is proportionately difficult of digestion.

The use of *cookery*, independently of the gratification of the palate, and the variety of tastes and flavours which it produces, is to render food both chemically and mechanically more digestible. "It appears from my experiments," says Mr. Hunter, "that *boiled*, and *roasted*, and even *putrid* meat, is easier of digestion than raw." By cookery meat is rendered shorter, or its texture more separable, than when raw; and when the process is the wholesomest, the oil is in part extracted. The wholesomest cookery is *broiling;* in which the portion of meat is of no great thickness, and its fibre is cut across. The action of heat upon the divided fibre and the connecting tissue, renders the texture more penetrable, and from the cut surface the melted fat easily exudes. *Roasting* is next to broiling; not so wholesome, because the contraction of the surface compresses and hardens the interior of the meat, and the oil has a less free escape. *Baking* is inferior to roasting, as the want of motion and the closeness of the oven contribute to detain the oil. *Frying* is unwholesome, inasmuch as it adds oil, and that partly in its worst state, the empyreumatic. *Boiling* has the advantage of extracting the oil from meat, but it gives hardness by coagulating the albumen. By the process of *stewing* this evil is avoided; but, on the other hand, much that is nutritious is parted with in exchange for the mechanical increase of digestibility. Vegetable food, however, is wonderfully benefited by boiling; most vegetables would be wholly indigestible but for the softening which they thus attain.

The most digestible food is venison; its age makes it fibrinous; its texture is naturally not so close-grained as that of beef and mutton, and the period during which it is hung, gives it additional tenderness. Next to venison probably follow grouse, at least in weather which allows the bird to be kept sufficiently long. All game has relatively this looseness of texture; so a pheasant or partridge is more digestible than a turkey or barn-door fowl. Facts of this description, which Dr. Beaumont ascertained, are at variance with the opinions which for a long time held their ground. I am fully satisfied of their correctness by observations that I have had opportunities of making on the powers of weak stomachs. The length of time that adult game will keep, not only makes it tenderer, but likewise brings out its flavour, which tends in another way to promote digestion. Nothing is more tasteless than a pheasant cooked too soon, or has a finer flavour after hanging a proper length of time. No doubt this flavour, while it gratifies the palate, assists digestion, by sympathetically exciting the stomach.

Albuminous food is easy of digestion, just in proportion to its mechanical condition. White of egg, which is nearly pure albumen, if taken into the stomach either very slightly or not at all coagulated, is perhaps as rapidly chymified as any article that we use for food. If previously formed into hard coagula, by heat or otherwise, and swallowed in large solid pieces, it experiences a very protracted digestion. The reason is intelligible enough. In the first case, the albumen coagulates in the stomach in a light, filmy, porous, semitransparent, watery substance, having been penetrated or infiltrated with the gastric juice, while it was yet fluid. In the second case, the gastric juice has to operate, not on the whole at once, but upon layer after layer of its surface. Minuteness of subdivision, such as protracted mastication produces, will, therefore, render albumen that has been coagulated again digestible. Eggs are most wholesome when lightly done, as by boiling for two minutes and a half, to three minutes. Eggs when raw are laxative, when cooked hard the reverse. The coagulated yolk is often of great use to young children with weak insides.

The flesh of young animals is less digestible than that of adult animals, which is attributed to its containing a larger proportion of gelatin and less fibrin. But jelly by itself, Dr. Beaumont found to be of quick and light digestion. Unlike albumen, gelatin is unsusceptible of coagulation; and it is probable that the gastric juice acts directly upon it in its soft solid state.

Broths and soups are difficult of digestion, if made a meal of. In small quantity, they mingle with the other food, and do not disturb the process, being divided among and incorporated with the solid aliment. When the stomach has to operate upon a soup alone, it appears embarrassed between the direct absorption of the liquid part, and the difficulty of acting upon the aliment so much diluted. Digestion is slow; the superfluous liquid is tardily absorbed; and then only, the rest is chymified. Broth or soup may be rendered easily digestible by being thickened with any farinaceous substance; the superfluous water is then used in reducing the solid matter; bread eaten with every mouthful of soup answers as well. Barley in broth contributes to the same end.

The habitudes of the stomach, in respect to broths and soups, appear to be very capricious. In health and strength, those articles are certainly indigestible, unless qualified in the manner above described. On the other hand, after fatigue, or after medicine, or during a cold, good broth is as wholesome as it is refreshing. A cold that is not inflammatory increases the power of digestion.

Fish, as it consists of many different kinds, presents every degree of digestibility. The most digestible is whiting boiled; broiled it is less so; (fried still less). Haddock next, plain boiled, or broiled. Cod is richer and heavier, as are soles and turbot. Eels, when stewed, are, notwithstanding their richness, digestible. The patients in hospitals, when convalescent and indulged with choice of food, commonly ask for and digest this dish. Perch is, perhaps, the most digestible river-fish.

Salmon is not very digestible in the state in which it reaches the London market. The oil of its fat, which, when fresh, forms a curd between the flakes, by keeping, becomes diffused through the fish, and imparts to it a richness which weak stomachs often cannot contend with. In its freshest state, the fish is different, and materially wholesomer. The mode of treating the fish, just caught, and the philosophy of the process, are thus clinically given by Sir Humphry Davy.

"He is safe; we must now prepare him for the pot. Give him a stunning blow on the head to deprive him of sensation, and then make a transverse cut just below the gills, and crimp him by cutting to the bone on each side, so as almost to divide him into slices; and now hold him by the tail, that he may bleed. There is a small spring, I see, close under that bank, which I dare say has the mean temperature of the atmosphere in this climate, and is much under 50°—place him there, and let him remain for ten minutes; then carry him to the pot, and before you put in a slice let the water and salt boil furiously, and give the water time to recover its heat before you throw in another, and so proceed with the whole fish; leave the head out, and throw in the thickest pieces first.

"I am endeavouring to find a reason for the effect of crimping and cold in preserving the curd of fish. Have you ever thought on this subject?

"*Halieus.* Yes: I conclude that the fat of the salmon between the flakes of the muscles is mixed with much albumen and gelatin, and is extremely liable to decompose, and by keeping it cool, the temperature is retarded; and by the boiling salt and water, which is of a higher temperature than that of common boiling water, the albumen is coagulated, and the curdiness preserved. The crimping, by preventing the irritability of the fibre from being gradually exhausted, seems to preserve it so hard and fresh that it breaks under the teeth; and a fresh fish not crimped is generally tough*."

Shell-fish is slow of digestion, but some more so than others; crab than lobster, lobster than oysters, when the latter are eaten raw. Oysters when stewed or escalloped are rendered hard and less digestible.

Oil is generally indigestible. This probably arises rom the difficulty which a watery liquid, such as the gastric juice, has in penetrating it. It is the want of heterogeneous adhesion between the fluids, which prevents the one from acting upon the other. The oil repels the water of the gastric juice. I believe, however, that oil in small quantity, or in minute division, and administered with other food, is to most persons not indigestible. It is not felt to be so; and it is remarkable that in the choice of food in training, where adult or fibrinous meats are recommended, and fat is forbidden, yet that the lean of fat meat is preferred, in the texture of which there is probably more oil than in the lean of thin meat. The mixture of oil in salad appears to render the raw vegetable more digestible. Fat with meat is commonly unwholesome to, and disliked by, both *the young* and *the aged*, and ought to be shunned in their diet. Yet bacon is generally digestible even to weak stomachs.

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* Davy's *Salmonia.*

Dr. Beaumont found that meats containing any quantity of oil commonly caused a flow of bile into the stomach. He was unable to satisfy himself whether the mixture of the bile with the gastric juice is salutary, and for the purpose of promoting the digestion of refractory food; or a mischievous result of the disturbance of the stomach, produced by the presence of less digestible aliment. However this may be, persons of the bilious temperament are generally unable to digest oily meats, such as pork, and goose, and duck. But there is something in these meats, besides their fat, that renders them unwholesome. The mischief arising from the oily nature of meats is increased by their being hot; when eaten cold they are more digestible.

Milk is lightly curded in the stomach by the gastric juice, and the curd digested like albumen. Fresh milk is rich from the oil contained in its cream; it is on this account indigestible to many. It loses part of its richness by boiling; and then, or mixed with lime-water, can be digested by those in whom it else produces heart-burn. Cheese eaten with bread alone, as a meal, is digestible, but not easily so; in conjunction with other viands, it is, perhaps, more wholesome toasted.

Farinaceous food is digestible, or otherwise, on the principles already explained. Bread, not very new, is perfectly digestible. The process of fermentation gives it porousness of texture and penetrableness. The reason why new bread is less digestible is not evident; to say that it swells on the stomach does not explain the matter. Biscuit is digestible from its crispness and shortness, being readily separable and broken into minute fragments. Arrow-root, sago, and such like, when pure, are in the condition of biscuit well and perfectly masticated, and are of very light digestion. Pastry is digested with difficulty, in consequence of the oil which it contains; puddings, from their heaviness, that is, closeness of texture; in proportion as they are light, they become digestible. Semolina and maccaroni, when not browned, are highly digestible.

There is great difference in the digestibility of the potato; those which are rendered by boiling barely soft, and remain tenacious, stay long undissolved in the stomach; in this state they were found in Dr. Beaumont's experiments to yield very slowly to the action of the gastric juice when submitted to it in phials in a sand-bath. Pieces of raw potato, when treated in the same manner, almost entirely resisted the action of the gastric juice; many hours elapsed before the slightest appearance of digestion was observable, and then only upon the surface, where the external laminæ became a little softened, mucilaginous, and slightly farinaceous. The potato which is, on boiling, mealy, and breaks into flour on pressure, is extremely digestible. The same principles determine the digestibility of different preparations of rice.

Chestnuts are heavy, and difficult of digestion; when kept some time they become less so, and are rendered more palatable, through the greater evolution of their saccharine principle. Their digestibility is much increased by the perfectness with which they are roasted and masticated.

Esculent roots, as carrots, turnips, Jerusalem artichokes, when well cooked, are digested easily, though less so than meat and farinaceous food; but they often, from the water they contain, produce flatulence: peas and beans the same.

Crude vegetables, by some law of the animal economy, not well understood, are allowed, even when the stomach is in a healthy state, sometimes to pass from it into the intestines, while other food is retained there to receive the solvent action of the gastric juice. The vegetables that are eaten raw, have either some stimulating property, as mustard and cress, horse-radish; or like lettuce and celery, have considerable crispness and lightness of texture. They are at best, however, of difficult digestion.

To complete the remarks which I proposed to lay before the reader on the digestibility of food, I subjoin a tabular view of a series of observations made by Dr. Beaumont on the reduction of the meals introduced into the stomach of Alexis St. Martin. These observations are in every point of view extremely interesting. They show the average and the extremes of the time that digestion occupies. They present some important lessons as to the digestibility of different kinds of food; and they tend to exhibit, what is more important still, how much less the natural digestibility of food has to do with the time of its disappearance from the stomach, than many other causes,—such as the sparingness of the preceding meal, the state of the spirits, of the weather, the degree of previous exhaustion, and the like.

ARTICLES OF DIET.	Mode of cooking.	Meal.	With Bread, or Vegetables, or both.			REMARKS.
			Exercise.			
			Moderate.	Increased.	Rest.	
			H. M.	H. M.	H. M.	
Tripe, soused	Fried	Breakfast	1 00			
Pig's feet, do.	Boiled	,,	1 00			
Venison steak, fresh	Broiled	,,	1 35			
Codfish, dry,	Boiled	Dinner	2 00			
Bread and Milk	Cold	,,	2 00			
Turkey	Roasted	,,	2 30			
Goose, wild,	,,	,,	2 30			
Pig, young,	,,	,,	2 30			
Hash, Meat and Vegetables	Warm	Breakfast	2 30			
Oysters	Raw	Dinner	2 45	. . .	. . .	Oyster suspended in stomach during experiment.
Ditto	Stewed	,,	3 30	. .	. . .	
Ditto	Raw	Breakfast	3 00	. . .	. .	Nothing but a little dry bread or cracker taken at these meals.
Ditto	,,	Dinner	3 00	. .	. . .	
Ditto	Stewed	,,	3 30	. . .	. .	
Beef, fresh, fat, and lean	Roasted	,,	3 30			
Ditto	,,	,,	3 00			
Ditto	,,	Breakfast	2 45			
Ditto	Broiled	,,	3 00			
Ditto	,,	,,	. . .	. .	3 45	
Ditto	,,	,,	. .	3 30	. .	Exercised till fatigued.
Ditto	Boiled	,,	4 00	. . .	. . .	Morbid appearance of stomach.
Ditto	,,	Dinner	. . .	3 30		
Ditto	,,	Breakfast	3 38	. . .	. . .	Large proportion of fat.
Ditto	,,	Supper	. .	. .	4 00	Ditto.

ARTICLES OF DIET.	Mode of cooking.	Meal.	With Bread, or Vegetables, or both.			REMARKS.
			Exercise		Rest.	
			Moderate.	Increased.		
			H. M.	H. M.	H. M.	
Beef, fresh, fat, and lean	Boiled	Breakfast	. . .	. . .	4 30	Large proportion of fat, and in recumbent position.
Ditto	”	Dinner	3 30			
Ditto	”	”	. . .	. . .	4 00	
Ditto	”	Breakfast	. .	. .	4 15	
Ditto	”	”	3 30			
Ditto	”	”	. . .	. . .	4 15	
Ditto, salted	”	Dinner	5 30			
Ditto, ditto	”	”	3 30			
Pork, recently salted	”	Breakfast	5 15			
Ditto	”	”	4 30			
Ditto	”	”	5 15	. . .	. . .	Became angry during experiment.
Ditto	”	”	6 00	. .	. .	Unusually full meal.
Ditto	”	”	4 30			
Ditto	”	”	4 30			
Ditto	”	”	4 30			
Ditto	”	Dinner	4 30			
Ditto	”	Breakfast	. . .	4 00		
Ditto	”	Dinner	. .	3 30		
Ditto, fresh	Roasted	”	6 30	. . .	. . .	Unusually full meal.
Ditto, steak	Broiled	”	3 15			
Ditto	”	Breakfast	4 30			
Mutton, fat and lean	Roasted	Dinner	3 15			
Ditto	Broiled	Breakfast	. . .	3 00		
Ditto	”	”	3 30			

ARTICLES OF DIET.	Mode of cooking.	Meal.	With Bread, or Vegetables, or both.			REMARKS.
			Exercise, Moderate.	Exercise, Increased.	Rest.	
			H. M.	H. M.	H. M.	
Mutton, fat and lean	Broiled	Breakfast	4 30	. . .	. . .	Morbid appearance of stomach.
Ditto	”	Dinner	4 00			
Ditto	”	Breakfast	4 30	. . .	. .	Full meal, coarsely masticated.
Eggs	Hard boiled	”	3 30	. .	. . .	Bread or bread and coffee, no vegetables used with the eggs.
Ditto	Soft boiled	”	3 00			
Ditto	Hard boiled	Dinner	5 30	. .	. .	Morbid appearance of stomach.
Ditto	”	Breakfast	3 30	. . .	. . .	Ditto
Ditto	Soft boiled	Dinner	3 00			
Sausage	Broiled	Breakfast	3 30	. . .	. .	With soft boiled eggs.
Ditto	”	Dinner	3 00			Muslin bag containing same kind of diet, suspended during these experiments, morbid appearance of stomach also.
Ditto	Fried	Breakfast	4 00	. . .	. .	
Ditto	”	”	5 00	. .	. . .	
Ditto	Broiled	”	3 30			
Ditto	”	”	. . .	4 15	. . .	Full meal—severe exercise.
Fowls (hens)	Boiled	”	4 00	. . .	. .	With bread and coffee.
Ditto	”	Dinner	4 00	. .	. . .	With bread and water.
Ditto	”	”	4 00	. . .	. .	Ditto ditto.
Veal, fresh,	Broiled	Breakfast	4 00	. .	. . .	Muslin bag suspended in stomach.
Ditto	”	Dinner	4 00			
Ditto	”	Breakfast	4 00			
Ditto	”	Dinner	4 45	. . .	. . .	Morbid appearance of stomach.
Ditto	”	Breakfast	. . .	3 45		
Ditto	”	Dinner	4 30			
Ditto	”	Breakfast	5 30	. . .	. . .	Morbid appearance of stomach.

	H.	M.
Soup, made of fresh muscular fibre of beef, and vegetables,	4	00
Do. made of the hock, with vegetables,	4	15
Bread, buttered, for breakfast, with coffee [morbid appearance of stomach]	4	15
Do. buttered, for breakfast, with coffee,	3	45
Do. dry, for breakfast, with coffee	4	00
Do. dry, for dinner, with dry mashed-potatoes	3	45

THE second point to be considered in our food is the *quantity of nutriment* contained in it.

It may be considered to be proved by general experience, that animal food is more nourishing than vegetable food, and the flesh of adult than that of young animals. The best testimony which can be adduced upon this point, is that of trainers. The following is the account of the diet used in training, communicated to Sir John Sinclair, by Mr. Jackson.

"The diet is simple,—animal food alone; and it is recommended to take very little salt and some vinegar with the food, which prevents thirst, and is good to promote leanness. Vegetables are never given, as turnips, or carrots, or potatoes. But bread is allowed, only it must be stale. They breakfast upon meat, about eight o'clock, and dine at two. Suppers are not recommended, but they may take a biscuit and a little cold meat about eight o'clock, two hours before they go to bed. It is reckoned much against a man's wind to go to bed with a full stomach, and they in general take a walk after supper. Some people will have tea, but it is not recommended, nor is it strengthening, and no liquor is given warm. Full and substantial meals are given at breakfast and dinner: beef and mutton are best. It is contended that there is more nourishment in the lean of meat than the fat, which is fully proved by experiment; fat, being of a greasy nature, causes bile, and palls the stomach*: the lean of fat meat is best. Veal and lamb are never given, nor is pork. The legs of fowls, being sinewy, are much approved of. The yolk of a raw egg is reckoned the best thing in a morning, and is supposed to prevent bilious complaints. Beef-steaks are reckoned very good, and rather underdone than otherwise, as all meat in general is; and it is better to have the meat broiled, than roasted, or boiled, by which nutriment is lost. No fish whatever is allowed, because it is reckoned watery, and not to be compared with meat in point of nutriment. The fat of meat is never given, but the lean of the best meat. No butter nor cheese on any account; cheese is indigestible. Meat must be dressed as plain as possible, without seasoning of any kind. Men will live longer on beef, without change, than on any other kind of animal food; but mutton is reckoned most easily digested. The meat must always be fresh, and never salted. No quantity of meat is fixed; it depends upon the constitution and appetite. Little men will eat as much as large men, and very frequently more. Pies and puddings are never given, nor any kind of pastry. As to hard dumplings, people may as well take earthenware into their stomach, they are so very indigestible."

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* Nevertheless, it is always laid down that oil is the most nutritive ingredient in food. It soonest cloys, no doubt, and is indigestible; it soonest, therefore, satisfies. This, and the facts that oil contains a large proportion of carbon, and is concentrated food, seem to have led to the received opinion.

The systematic and violent exercise, which forms the basis of training, and for which the most nutritive food alone would supply strength enough, will be spoken of in the next chapter.

The following was the food taken by Captain Barclay in his most extraordinary walk of a thousand miles in a thousand successive hours, June 1, 1809:—

He *breakfasted*, after returning from his walk, at five in the morning. He ate a roasted fowl and drank a pint of strong ale, and then took two cups of tea, with bread and butter.

He *lunched* at twelve; the one day on beef-steaks, and the other on mutton-chops, of which he ate a considerable quantity.

He *dined* at six, either on roast beef, or mutton-chops. His drink was porter, and two or three glasses of wine.

He *supped* at eleven, on a cold fowl. He ate such vegetables as were in season; and the quantity of animal food he took daily was from five to six pounds.

It may be interesting to contrast with the means by which the muscular strength is maintained in its highest vigour, preparatory to the most violent, or during the most protracted exertion, the details of the system by which, without direct reference to strength, though that is marvellously maintained at the same time, the frame is reduced to the utmost by combining the least nutritious diet with depletory exercise.

Mr. Sandevir, a surgeon of Newmarket, communicated to Sir John Sinclair the following particulars as to the mode in which jockeys reduce their weight.

With those in high repute as riders, training or wasting is continued, in a greater or less degree, from about three weeks before Easter to the end of October; but a week or ten days is quite sufficient for a rider to reduce himself a stone to a stone and a half.

Their diet is lowered to this extent. "For breakfast, a small piece of bread and butter, with tea in moderation. For dinner, a very small piece of pudding, and less meat; and when fish is to be obtained, neither one nor the other are allowed. Wine and water is their usual beverage, in the proportion of one pint of wine to two of water. Tea in the afternoon, with little or no bread and butter, and no supper.

"After breakfast, having sufficiently loaded themselves with clothes, that is, five or six waistcoats, two coats, and as many pairs of breeches, a severe walk is taken, from ten to fifteen or sixteen miles; after their return home they put on dry clothes, and, if much fatigued, some of them will lie down for an hour before dinner; after which no severe exercise is taken, but the remaining part of the day is spent in that way that may be most agreeable to themselves. They generally go to bed by nine o'clock, and continue there till six or seven the next morning. Some of them, that do not like excessive walking, have recourse to medicine, commonly Glauber's salts, two ounces the dose.

"John Arnall, when rider to His Royal Highness the Prince of Wales, was desired to reduce himself as much as he possibly could, to enable him to ride some favourite horse, without his carrying more weight than was agreed upon; in consequence of which he abstained from animal, and even farinaceous food, for eight succeeding days, and the only substitute was now and then a piece of apple; he was not injured by it.

"Dennis Fitzpatrick, a person at this time continually employed as a rider, declares that he is less fatigued by riding, and has more strength to contend with a determined horse in a severe race, when moderately reduced, than when allowed to live as he pleased, although he never weighs more than nine stone, and frequently has reduced himself to seven stone seven pounds."

The preceding examples are valuable as showing the impressions of practical persons upon the questions of what diet is the most nourishing, what the least so. We seem authorized to conclude that meats contain the most nutriment, milk and eggs the next, the best farinaceous food the next, fish the next, vegetables the least. This knowledge has the following applications.

Persons in health, leading ordinary lives, and taking moderate exercise, have rather to avoid superfluity of food, than to seek what is most nutritious. If, therefore, they have not self-command enough to limit themselves to a sparing quantity of the most nourishing food, they may learn from these remarks what is least so.

In young persons of the strumous diathesis, the stomach is less weak than easily disordered; the tongue is furred, the appetite capricious, often excessive; food too light does not furnish nourishment enough; nutritive food, in too great quantity, deranges the stomach and heats the system; two moderate meals of animal food, the most digestible and varied, are requisite daily, and with one, wine or ale: besides these two light farinaceous meals.

To those of naturally good stamina, who are convalescent after fever, or inflammatory attacks, the lightest nutriment alone is commonly necessary; —gruel, arrow-root, beef-tea with dry toast, calves'-foot jelly, boiled whiting, and the like. The stomach does not want, and will not bear, stimulating; but it is weak and can chymify only the most digestible food; and that in small quantities. Its tone is sure to return spontaneously.

For those who, by a more melancholy fate, are sinking under mortal disease, as in various forms of cancer, nutrition and support alone are to be thought of. With such, whose days are numbered, the remote evils contingent upon the use of stimulants have not to be taken into account: jelly and arrow-root with wine, yolk of egg with brandy, and the like, are useful and proper now, in addition to more rich or substantial food, which the appetite will occasionally fancy.

Thirdly, of the *Stimulating quality of food.*

When we have considered digestibility and nutritiveness, a third quality of our food remains, of equal importance with either. Its influence does not, indeed, during health, tell at a single meal, or in a single day: but unless it is attended to, nutrition flags, the frame weakens, and death even may take place, brought on by this cause alone. This quality is the capability of drawing upon the energies of the stomach, of exciting it to an active discharge of its function, to vigorous secretion and motion. Or such is the constitution of our frame, that every part requires excitement and activity directly for itself, and sympathetically for the rest. One important vital organ falling into languor, the rest are, by a necessary enchainment, drawn on to feebleness. The application of this remark runs out to a great variety of instances.

The strength of an organ, when in health, can only be maintained by the regular exercise of its function. Thus the strength of the bones, and sinews, and muscles, and the perfection of the organs of the senses, are preserved by constant use.

Applying this principle to the stomach, we may conclude it to be necessary not only that the food introduced into it should be digestible and nourishing, but that it should be, to a certain extent, *difficult of digestion*, to call out and exercise the force of the stomach.

M. Magendie made some very remarkable experiments, the results of which probably turned in great measure upon this principle, although he attributed them to another. He found that animals fed exclusively upon sugar, or upon gum, or upon butter, for a few days throve as usual, but then began to fall away, became emaciated, and died. The solution of the fact he supposed to be the want of azote in the aliment which he gave to the subjects of the experiment. It is probable, however, that the concentratedness of the food contributed principally to the result*.

It is stated in Sinclair's Code of Health, that a dog was fed upon the richest broth, yet could not be kept alive; while another, which had only the meat boiled to a chip (and water), throve very well†.

Another principle in the animal œconomy is, that to sustain an organ in perfect health, its exercise should be varied. How much this contributes to health of mind will be noticed afterwards, to the perfection of the organs of the senses, of the bodily frame; in the case of the stomach it applies with no less certainty. *Diet should be varied.*

It is reasonable to presume that the injurious effect shown in Magendie's experiments just adverted to, depended in part upon the want of variety in the food, and would have been postponed, if not averted, had this circumstance been attended to. A series of experiments directed to this point would be highly interesting.

In the case of the stomach, it is possible to combine, simultaneously, the operation of both of these principles. In a single meal the food may be mixed, and indeed, to a certain extent, it always is so.

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* The Kamtschadales are frequently compelled to live on fish-oil, but they judiciously form it into a paste with sawdust, or the rasped filings of indigenous plants.——*Dr. Paris.*

† Soups, as a principal or exclusive diet for the healthy, are a physiological error. They combine indigestibleness with concentratedness. Bread and water is far more wholesome.

The observations made by Dr. Beaumont show that the stomach attacks simultaneously substances of different digestibility introduced into it, and despatches them in the same time as if they had been there singly. Thus of a meal made of venison and pork, the first disappears in half the time of the second. The pork does not make the venison less digestible.

There are, however, limits to this principle. One may be, that one substance thoroughly indigestible to a particular stomach may disorder the digestion of all the wholesome substances which accompany it: and the more the dishes tasted, the greater the chance of coming upon the slight touch of garlic or other matter, which, to the idiosyncrasy of this or that individual, may be poisonous.

In another view, mixed food is certainly useful,—when taken not daily, but occasionally,—on the principle immediately before explained, as varying, one day with another, the call upon the resources of the stomach.

There is again another salutary object that may be attained by a meal of different dishes. It may be desirable to take nourishment, when the appetite, from whatever cause, has faded and gone off. In that case a spoonful of soup, a flake of fish, a slice of cold beef, in succession, will provoke an appetite, and with it digestion, where the nicest mutton cutlet, or the most tempting slice of a haunch of venison, would have turned the stomach.

Another principle of the animal œconomy is the following. Every part (with the exception of those which have a function exclusively mechanical) when weakened, or called upon for more than usual exertion, may, within certain limits, be rendered capable of it by adequate *stimulation.* When the heart's action is flagging, brandy or ammonia will revive it; when a sportsman is wearied to the utmost at the close of a day's shooting, the certainty that game is at hand will re-invigorate his tired muscles.

The means by which digestion may be reinforced under parallel circumstances, are the use of condiments, certain vegetable infusions, and fermented and alcoholic liquids. The use of these means may be resorted to in every degree, from wholesome and salutary excitement of the stomach, to high and repeated stimulation, that in the end proves destructive through the debility which is its certain consequence.

Salt taken in moderation with food is not less wholesome than grateful to the palate. Its operation is not very clearly made out. But as it is sensibly a stimulant when applied to the tongue, such probably is its action on the stomach. It deserves to be added, that in solution it produces a fluid which has some analogy to the gastric juice:—that it is not nugatory is shown by the effects of excess in using it, or of total abstinence from it: the first, at least as exemplified in the extensive use of salted provisions, produces scurvy, the latter intestinal worms. Salt forms an important element in bread. About twelve ounces are generally added to each bushel of flour.

Of the vegetable acids, vinegar or lemon-juice are wholesome stimulants to the stomach when it has to contend with certain forms of indigestible food. These are rich and oily substances, as pork, goose, wild-fowl, salmon. The malic acid in apple-sauce eaten with the former, the lemon-juice with the third, the vinegar with the fourth, have thus come into common use. Whether they act as stimulants only, or directly assist the gastric fluid in the digestion of these rich aliments, is undetermined. There are foods, again, which are rich without being greasy, of which nature is, eminently, turtle. To assist the digestion of this highly flavoured and gelatinous viand, lemon-juice is usually added, and punch drank with it: the palate having suggested, and philosophy approving the association.

Vinegar promotes the digestion of lettuce, celery, beet-root; and to judge by our sensations only, it may be presumed that oil in this case acts as an auxiliary. [*Vide* p. 51.]

Aromatic condiments are either spices, or hot and savoury herbs and roots: to the former belong pepper, cayenne, cinnamon, nutmeg, &c.; to the latter, horse-radish, mustard, garlic, leeks, onions, sage, and the like.

One or other of these are commonly used as auxiliary stimulants in the cases last mentioned. They are used, being themselves unwholesome, to correct another form of unwholesomeness. They heat the stomach, and that is abstractedly bad; but the stomach is contending with refractory food, and therefore is the better for being heated.

Condiments of the spicy kind are not essential to the process of digestion in the healthy state of the system. No one, when in health, ever adds them to a dish, except on the conviction that the food it contains is indigestible, or from habit having rendered their use artifically necessary. Their continual use never fails to produce an indirect debility of the stomach.

All our drinks, with the exception of water, and those which, like chocolate or broth, combine nutriment with water, contain something which enhances the quality of food we are now considering. Coffee is stimulating both to the stomach and to the nerves. Tea, though less so, partakes of the same character, as any one is conscious of who takes a larger quantity, or another kind, than that to which he is accustomed. Coffee, as being the stronger stimulant, is the most prejudicial; on the other hand it may be the most salutary; and when the digestion is weak, it is sometimes better reinforced by a cup of coffee immediately after dinner, than by wine. Tea, in general, does more harm from the quantity of unnecessary liquid which it introduces into the stomach, than by its specific qualities. Unnecessary liquid weakens the stomach, and turns to wind.

The simplest stimulating liquid is soda-water: the carbonic acid which it contains and disengages in the stomach has a reviving and salutary effect upon it in many states of temporary debility. To permanently weak stomachs it is generally unwholesome. It is always unwholesome during a meal, but is an excellent beverage at some interval afterwards.

The more stimulating beverages are *fermented liquors*, being either beer, cyder, perry, or wines, and distilled spirits.

The wholesomest of these are the different varieties of *beer*, but even in these there are differences, which are evinced by their effects on different constitutions.

The principle common to all beer is more or less of the bitter or astringent quality of the hop. The salutariness of this principle is shown in various ways. Dr. Paris observes, "No cattle will thrive upon grasses which do not contain a portion of this vegetable principle; this fact has been most satisfactorily proved by the researches of Mr. Sinclair, gardener to the Duke of Bedford, which are recorded in that magnificent work, the '*Hortus Gramineus Woburnensis*.' They show that if sheep are fed on yellow turnips, which contain little or no bitter principle, they instinctively seek for, and greedily devour, any provender that may contain it; and that if they cannot so obtain it, they become diseased and die."

Nothing can be more generally wholesome than good table-beer. Sydenham always took a glass at his meals, and considered it a preservative against gravel *.

Mr. Jackson in his answers to queries put by Sir John Sinclair observes, "Malt liquor, good and old, without bottling, is best. If any person accustomed to drink wine would try malt liquor for a month, he would find himself much the better for it."

In his directions for the diet of persons in training Mr. Jackson observes, "Malt liquor is best, and particularly home-brewed beer, old, and never bottled, that being windy. As to wine, a little red wine, which is much preferable to white; never more than half a pint of wine after dinner, and none after supper. The quantity of beer not to exceed three pints during the whole day, taken with breakfast and dinner, and a little after supper.

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* Beer was introduced into this country in good company, if the following couplet is true:—

"Hops, reformation, turkeys, carps, and beer,
Came into England all within a year."

Sometimes white wine and water is allowed to a man at breakfast, who does not like malt liquor. The liquor should not be taken in great draughts, but by mouthfuls, which quenches the thirst better, and that is the only object required. Liquor is always given cold, but never before meals, unless in cases of extreme thirst, when a little white wine and water may be taken. A gentleman in training, if he merely wishes to get into good condition, may take wine and water instead of malt liquor, if he prefers it."

Cider and perry, Dr. Paris remarks, are grateful drinks in hot weather, but as they do not contain a sufficient quantity of spirit to prevent their passing into the acetous fermentation in the stomach of an invalid, they should be avoided by those who have any predisposition to indigestion. They want the salutary bitter of beer, without having alcohol enough to compensate for its absence.

Wines.—To those who are in perfect health, and do not exceed their strength, it is to be presumed that wine is not merely useless, but positively injurious. It excites the stomach and nervous system, and that excitement is followed by proportionate debility. Wine, then, is a poison; but, taken in moderation, it is a poison that operates extremely slowly. Like other poisons, when the system is in certain states of disorder, wine is administered beneficially.

There are those, whose delicacy of constitution and weakness of digestion (persons, for example, of the strumous diathesis,) require the support of wine. In many who are recovering from exhausting illness, the restorative effects of wine are not less necessary, and are more immediately appreciable. During health, again, the frame frequently falls below its proper strength, which admits of being beneficially raised by this means. The stomach, lowered in tone through mental anxiety, or bodily fatigue, may be unable to digest, and the appetite to relish food, unless its energies are recruited by wine. Some, again, there are, who are obliged, knowing at what price, to exert themselves, mentally or bodily, or both, beyond their strength; with the assistance of wine, they are rendered capable of making efforts, under which their frame would else give way.

Commonly, however, wine is drank in quantity by those alone who have no excuse for the indulgence, and no motive but thoughtless gratification; who, wanting other resources, use their health but to throw it away, and their wealth to furnish the means of dissipating it.

As wines differ in their flavour, so likewise do they differ in their effects. Their different properties require to be studied both by those who have occasion to use them for their profit, or, drinking them as a luxury, would shun superfluous harm from their use. The principal, but by no means all the effects of wine, depend on the proportion of alcohol which it contains. But, independently of strength, one wine is astringent, another rich and cordial, a third dry, while a fourth is remarkable for the prompt but evanescent excitement it produces.

All wine has a period at which it attains its finest flavour, and is most wholesome. This period differs with every wine, and with every growth of every wine. New wine is more heady, heating, and liable to disturb digestion; wine too old, on the other hand, is acid.

I first subjoin Mr. Brande's analysis of wines in reference to the quantity of alcohol which they contain; and will afterwards comment upon other differences of particular wines.

TABLE of the quantity of ALCOHOL (specific gravity ·825) at 60° Fahrenheit, in several kinds of Wine and other Liquors.

	Per cent. by measure.
Port, average of three kinds	23·48
Ditto, highest	25·83
Ditto, lowest	21·40
Madeira, highest	24·42
Ditto, lowest	19·34
Sherry, average of four kinds	17·92
Sherry, highest	19·83
Ditto, lowest	12.25
Claret, average of three kinds	14·43
Calcavella	18·10
Lisbon	18·94
Malaga	17·26
Bucellas	18·49

	Per cent. by measure		Per cent. by measure.
Red Madeira	18·40	Cape Muchat	18·25
Malmsey do.	16·40	Constantia	19·75
Marsala	25·87	Tent	13·20
Ditto	17·26	Sheraz	15·52
Red Champagne	11·30	Syracuse	15·28
White do.	12·80	Nice	14·63
Burgundy	11·55	Tokay	9·88
Ditto	11·95	Raisin Wine	25·77
White Hermitage	17·43	Grape do.	18·11
Red do.	12·32	Currant do.	20·25
Hock	14·37	Gooseberry Wine	11·69
Ditto	8·88	Elder Wine, Cyder, and Perry	9·87
Palm wine	4·70		
Vin de Grave	12·80	Stout	6·80
Frontignac	12·72	Ale	8·88
Cote Roti	12·32	Brandy	53.39
Roussillon	17·26	Rum	53·68
Cape Madeira	18·11	Hollands	51·60

The wines principally known in this country, may be classed in the following manner.

1. *Strong and dry wines.* These are of two classes, the non-astringent and the astringent.

The non-astringent are Madeira, Sercial, Sherry, which are the best; Marsala, Cape wine, the inferior descriptions.

Madeira and sherry are the wines most generally wholesome in this climate for those who require wine. Taken thus, in a manner medicinally, they are better drank after than during dinner. Three glasses are sufficient to recruit all ordinary exhaustion, or to ensure the digestion of any moderate repast. The same quantity is less heating when diluted with water. In persons of the gouty diathesis, to whom from want of stamina or a relaxed habit of body wine is necessary, these wines are invaluable. In such constitutions they sometimes require to be given in considerable quantities, a pint or more daily.

The finest and driest sherry is called Amontillado. The fineness of the wine results from an accidental perfectness of the fermentation. Out of forty butts collected from the same vineyards, not above two or three have this quality: they are reserved to flavour the inferior growths.

The astringent strong and dry wines are Port, Benecarlo, &c. Of these, port alone is generally known in England.

Port, if new, is heady, and disturbs digestion, causing bile to flow into the stomach. All port does this with the bilious, and can seldom be drank by them on that account. There are others with whom port wine invariably produces heart-burn. Port, if bottled too soon, alters very slowly; and if a full wine, retains, with its colour, its lusciousness and sweetness, for fifteen or twenty years, without material improvement; it retains at the same time much of the unwholesomeness of new wine. Port wine, kept too long in the wood, on the other hand, continues to change rapidly after bottling, becoming in a few years tawny, losing its astringency, and acquiring a slightly acid taste. In this state port wine is again unwholesome, having an increased tendency to produce gout. Port originally of a good quality, that has been kept in the wood a proper length of time, (which for the mixed wine as we receive it in this country varies, according to its quality, from two to five years,) and in bottle from five to twenty, to those with whom it agrees, is extremely wholesome. There are many persons who suffer from gout with whom port does not disagree, and who continue to drink it in reduced quantities during the fit with advantage.

Port wine is doctored in the following manner. The finest growths are used to flavour, in different proportions, the inferior growths. Nothing is more capricious than the vintage. The favourable vintages in the present century have occurred in 1802, 1811, 1815, 1820, 1821, 1825, 1834. This is generally the same for all wines. The mixture sent from Oporto to the best houses in London commonly includes several vintages: it is brandied before being shipped. French brandy is only admitted into Portugal under a heavy duty; and the brandy which is there made is extremely bad: this deteriorates the wine. The quality of hardness, which is one of the worst that port wine can have, and the most unwholesome, is attributed to a mixture with particularly bad brandy. The mixtures, as the vintages, differ in fulness of body and lusciousness. Time reduces those qualities, but never makes very sweet port good.

There is one criterion of fine and old port, which I never knew fail, although it may be an accident. The cork, when it has dried, that is to say, an hour after it has been drawn, should be covered on its under surface and part of its cylindrical surface with crystals of tartar.

Benecarlo is a coarse-flavoured astringent Spanish wine. Some extremely old benecarlo which I tasted, preserved the astringency, combined with a high and agreeable flavour.

Val de Peñas unites a slight astringency with the quality and flavour of the next class.

2. *Light and generous wines.* Under this head may be included claret and Champagne.

Fine claret, of which the three best growths are Lafitte, Chateau Margaux, and Latour, the first of the most delicate flavour, the second fuller, and the third still more so, is one of the most perfect wines. In lightness, flavour, soundness, it exceeds most. It has, however, a gouty tendency. Almost all the clarets drank in England have flavour and body given to them by a mixture with hermitage.

The two best kinds of Champagne do not sparkle; these are Sillery and Ay. Sillery is dry, Ay sweet. No wines can be finer or purer, or more wholesome. A man may drink more Sillery with impunity than any other wine.

The *Mousseux* wine is either sparkling or creaming. The former contains the most carbonic acid. The sparkling and the creaming kinds are bottled before fermentation is completed, the sparkling sooner than the creaming.

The carbonic acid in Champagne *Mousseux* imparts to it its exciting quality. This wine has a strong tendency to produce gout. There are a few whose digestion and whose nerves it unsettles; but generally it is extremely wholesome, more so than most wines; it exhilarates more, while it heats less than other wines.

Attempts have been made to give to other wines the mousseux quality by bottling them before fermentation is completed. They are failures to the taste of a connoisseur.

There is another wine, however, which is pleasant and wholesome as an effervescing wine. This is St. Peray. It is remarkable for its natural unbrandied strength.

Rich and sweet wines. Of these the principal and much beyond the rest, when good, is Tokay. Its flavour for richness, delicacy, and duration upon the palate, exceeds that of every other wine: its flavour depends on no element that deranges the stomach or nerves.

The wines of this class that follow Tokay may be enumerated in the following order of excellence. Vin de Paille, Paxarete, Mountain, Spanish muscatelle, Rivesaltes, Constantia, Malmsey Madeira. All these are admirable cordials. Cyprus, when of the finest quality, which is as rarely met with as good Tokay, should stand high on the above list.

The highly-flavoured wines of Frontignan, French muscatelle, &c., are lighter, less wholesome, having undergone an imperfect fermentation.

Aromatic wines. This term is hardly appropriate, but it is used to express the qualities peculiar to Burgundy. The perfume of this wine is connected with something that acts powerfully on the system, so that two or three glasses, with many, disorder the stomach and the nerves to a remarkable degree. To a great many the impression, though perceived, is not enough to be disagreeable. Fine old hermitage, with greater wholesomeness, has even a fuller flavour than Burgundy.

Acid wines. Johannisberg, hock, as well as the inferior species of this class, combine with little spirit a sensible acidity, and different degrees of body and flavour.

In some of the finest, the *bouquet*, though quite unlike, reminds you, by its powerful quality and influence on the nerves, of Burgundy. In ordinarily good hock or Rhenish wine, this is not perceptible.

Some of the lighter wines of this class, Moselle for example, are artificially flavoured, and are an agreeable beverage in the summer. But upon the whole, these light Rhenish wines, and the corresponding French wines, are greatly inferior to good table-beer, and are much less wholesome: they are commonly drank because they are wine, by those with whom stronger wines disagree.

One remark is always introduced when the effects of wine upon the system are noticed. It is justly held that mixing wines renders them doubly noxious.

When wine is declared to be unwholesome from its stimulating properties, it is unnecessary to reprobate the use of ardent spirits. Their total exclusion from the diet of persons under training is their sufficient condemnation. Mr. Jackson says:—"In training, spirits are never allowed on any consideration whatever." Their parching quality is not redeemed, or redeemable, by any means; they heat the stomach, derange the liver, and lead, as Dr. Bright has pointed out, to structural disease of the kidneys, crowning their deleterious agency by shattering and overthrowing the brain and nervous system. Yet they have their use, like night-shade, and hemlock, and tobacco*. They

* I have not introduced any notice of tobacco. It is certainly deleterious. Dr. Mott assures me that in the United States it is not uncommon to see persons whose hands tremble nervously, and whose minds are permanently affected by its

sometimes will recruit flagging vitality, when threatened with imminent extinction, and when all other means would be insufficient. A case, which I witnessed some years ago, made a deep impression upon me: a lady had been confined six days before, and had had no rest in the anxious attempt, to which she was unequal, of nursing her infant. She suddenly felt that she was dying. Her pulse intermitted, her hands and forehead were cold, and her features wore the character of dissolution. Happening to be in the house, I gave her brandy, which revived her a little, but she again fell into the same alarming state, and was again revived by the same means. In this way she passed the night, oscillating between existence and death, during which she drank two-thirds of a bottle of brandy, and owed her life to it.

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baneful influence. I have been told that many young men at Cambridge and Oxford have temporarily injured their healths in a similar way, though to a less extent; and I have known more than one instance of men advanced in life, who have been compelled to discontinue its use from its effect upon the head, producing disturbed and troubled sleep and headach. Add to which, the filthiness of the custom, which nothing but exposure to damp and cold and the night air, (against which a cigar is a salutary protection,) can justify.

"It is a custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs; and in the black stinking fume thereof, nearest resembling the horrible stygian smoke of the pit that is bottomless."—James the First's *Counterblast to Tobacco.*

III. Quantity of Food.

Different quantities of nutriment are required at different ages, by persons of different sexes, constitutions, habits of life. But every one possessed of moderate powers of observation can tell how much he individually requires.

A gentleman, upwards of seventy, as remarkable for his healthy and hale appearance, as early distinguished for his contributions to science, whom I remember to have heard questioned at dinner why he was so abstemious, answered, that he had always made it a rule to eat half only that he could, and that he believed he owed his health to the practice.

It may not appear to all easy to stop at this period of a repast, or even to know when they have reached it; but it is in the power of every one to observe when his first appetite is satisfied; after which some are tempted to begin again, and to start as it were with a second wind. This first appeasement of the appetite no one will overlook, if he masticates slowly, and directs his attention to the point before drinking a glass of wine.

There is a rougher rule for determining the quantity of food; which is, not to eat as much as will produce sensations of fulness, weight, oppression, torpor, langour, chilliness: the objection to this rule is that it requires a few excesses to furnish data for the calculation.

However he may learn to determine the limit, a person of sense will, as his habit, stop at every meal before he reaches a point which will leave him less capable than before of any exertion, mental or bodily. Rousseau somewhere says, with more justness than usually belongs to his visionary and morbid morality, that abstinence is the epicurism of reason.

Drinks are generally as essential to the system as food: the water of which they principally consist is necessary to make up for the constant waste of fluid. Much less drink, however, is required than might be supposed; on this occasion the appetite is no guide. It is true, indeed, that a person is not to drink unless he is thirsty; but it does not follow that he should drink because he is so. Nothing promotes thirst so much as quenching it, or grows more readily into habit than drinking. Much liquid weakens the stomach, and produces flatulence and fat.

The latter consequence has, perhaps, hardly been sufficiently attended to in rules laid down for those who have a disposition to obesity to combat. It is most remarkably exemplified in a case recorded in the second volume of the Transactions of the College of Physicians, of which the following is an abstract:—

Thomas Wood, a miller of Billericay, in Essex, was born in 1719, and, having grown to manhood, lived intemperately, eating fat meat three times a day, and drinking strong ale. About the age of forty, he became extremely fat; but, continuing well, he pursued his accustomed habits. In his forty-fourth year, indigestion, sickness, suffocation, swimmings in the head, and apoplexy, supervened; when, becoming acquainted with the writings of Cornaro, he determined to leave off his excesses. This he did gradually, and his health amended. In January, 1765, his allowance of animal food being now much reduced, he entirely left off ale, and drank water only. Still he was troubled with rheumatism and gout. He then took more exercise, used cold bathing, and left off animal food; and gradually was led *to leave off drinking entirely*, and to limit his food for the twenty-four hours to a pudding composed of one pound of the flour of which the best kind of sea-biscuit is made, boiled with a pint and a half of skimmed milk, without any other addition. It was conjectured that he lost ten, or perhaps eleven stone weight in the process of restoring himself "from the condition of a decrepit old man, to perfect health, and to the vigour and activity of youth." His pulse fell, in the process of reduction, to from forty-four to forty-seven pulsations in a minute.

When asked, "what first induced him to abstain from drink," he answered, that it happened one day that the servant had forgotten to bring his water at dinner as usual; that being then full of business, he did not think of calling for any; and that, having found himself easier and less oppressed by that meal than common, he determined to try whether a total omission of all liquids might not be an improvement to his diet, and that he soon found the experiment to answer. He added, that "he was further encouraged to abstain from liquids by an observation that he had made in feeding hogs. He never allowed these animals to drink; and to this he attributed the excellence of his pork, it being greatly valued on account of the whiteness and firmness of the flesh."

IV. Intervals between Meals.

It has already been stated, that the residue of one meal being in the stomach, does not necessarily interfere with the digestion of a fresh one. This, however, supposes either that the first meal or the second is light, or that the system required unusually fast recruiting; that is to say, that there was gastric juice and plenty for both. Practically, many take dinner after a late luncheon, or bread and butter with tea, after a late dinner, without feeling any inconvenience from the mixture of the meals. Nevertheless, as a general rule, where people are living in plenty, it is better to make the intervals such as suppose a complete digestion, and the stomach emptied for some period before the reception of the next meal.

As a corollary to this rule, the intervals should be directly proportional to the quantities of meals. This remark bears diversified applications. There is a weakness of digestion, which consists in the stomach being unable to furnish any great quantity of gastric juice at a time, although in the twenty-four hours a full proportion may be secreted. Persons with this form of weakness require light and frequent meals. In infants, in persons recovered from exhausting illness, in aged people, the digestive forces commonly present this feature.

A strong stomach will bear either alternative, and will feed either full and seldom, or lightly and frequently. Two hearty meals are best in such a case, as they are more natural, and as they call out to a greater extent the resources of the organ.

V. Conditions which strengthen or weaken the Digestive Powers.

The elements of a strong digestion, in a healthy frame, are the following:—The first and most important (because compatible with every mode of life) is abstemiousness: the stomach never overloaded, the frame kept by this means rather below than up to its full strength and animal force. How far this principle will go, is shown in an extreme case quoted by Mr. Hunter, in his remarks upon digestion.

Nothing (observes Mr. Hunter) can show more clearly that the secretion of the gastric juice is increased in proportion to the call for nourishment in the body, than what happened to Admiral Byron, Captains Cheap and Hamilton, when shipwrecked on the west coast of South America; who, after suffering months of hunger and fatigue, were reduced to skin and bone; yet, when they came to good living, Byron thus expresses himself: "The governor ordered a table to be spread for us, with cold ham and fowls, which only us three sat down to, and in a short time dispatched more than ten men with common appetites would have done. It is amazing that our eating to that excess we had done, from the time we first got among these kind Indians, had not killed us; we were never satisfied, and used to take all opportunities, for some months afterwards, of filling our pockets when we were not seen, that we might get up two or three times in the night to cram ourselves."

The next means of strengthening digestion is strong exercise with full nutrition. Training, Mr. Jackson observes, wonderfully sharpens the appetite.

The experiments of Sir Busick Harwood gave rise to the belief that exercise interferes with the act of digestion. This is true, however, only of violent exercise. That moderate exercise promotes digestion was ascertained by Dr. Beaumont in his experiments on Alexis St. Martin. He observed, at the same time, that the same cause, increasing the circulation, heightens the temperature of the stomach.

A dry state of the atmosphere, Dr. Beaumont observed, had equally the effect of raising the temperature of the stomach. A moist air lowered it. These conditions of the atmosphere influence digestion proportionably. Cold, in every one's experience, heightens the appetite, and increases the digestive powers; and unembarrassed thoughts, and youth, no less promote them.

The conditions which lower the digestive force, are for the most part the contraries of those which have been last enumerated.

Repletion overloads and exhausts the stomach, and fatigue palsies its powers and destroys appetite. Abstaining from exercise for a day invigorates the digestion,—for several days weakens it. These opposite phenomena turn upon the following principles:—We rise in the morning refreshed by sleep, and with a certain quantity of disposable energy. We may employ it any way. If we consume it in strong bodily exercise, there is none left for the stomach to use. If we stay at home all day, employed in reading or writing, by dinner-time we have used less than customary of our nervous power, and a superfluity remains for digestion. The principle which at length destroys the appetite of the recluse student, is the dependence of his stomach on the vigour of his entire frame. To circulate his blood, to strengthen his system, air and exercise are wanted; neglect of them sympathetically weakens his stomach. In age, the powers of the stomach gradually fail. "Cornaro," says Mr. Abernethy, "found that as the powers of his stomach declined with the powers of life in general, it was necessary for him to diminish the quantity of his food; by so doing he retained to the last the feeling of health." At the strongest period of life the digestive powers are liable to be temporarily exhausted by strong mental excitement, by hope or fear, by pleasure or pain, by the softer or the fiercer passions. Dr. Beaumont made the singular remark, that anger causes bile to flow into the stomach; hence the indigestion of the *choleric* man.

The causes which have been enumerated weaken the powers of the stomach. Under the conditions which have been stated, a small quantity of the wholesomest food alone can be digested. If a plain but hearty meal is eaten, that alone will cause indigestion. Part only of such a meal will be chymified; the rest will remain unchanged, producing a sense of weight at the pit of the stomach, distention from wind, heartburn, and sickness; or passing into the intestines, may cause violent and dangerous disorder.

When the symptoms of indigestion arise from the stomach being slightly overtaxed, and are limited to a sense of weight, distention, heartburn, they are easily relieved. The heartburn proceeds from a forcible effort on the part of the stomach to digest what it cannot. For this purpose, the stomach pours out a quantity of acid secretion, that is not wholesome gastric juice. This acid fluid is not a solvent, but an irritant, and the principal cause of the pain experienced. A few grains of carbonate of soda in a wine-glass of cold water, or joined with as many drops of *sal volatile* in a wine-glass of hot water, will neutralize the acid, and the stomach will be tranquillized. The patient has then only to wait, introducing nothing more into the stomach, which in a few hours will have recovered its tone, and secrete gastric juice enough to dissolve what remains of the meal.

If the indigestion has arisen from anything in the meal which is positively indigestible, as shell-fish, or salad, for instance, there are three things to be apprehended. The undigested substance may pass into the intestines, producing disorder there, and requiring laxative medicine to remove it, and cordials, with chalk and opium, to tranquillize the bowels. Or it may be immediately got rid of by nausea and vomiting, to which if there is a disposition, the patient had better promote it by drinking a large tumbler of warm water, containing a tea-spoonful of salt. Sometimes, however, the indigestible substance remains in the stomach for days, during which the patient takes his usual meals, *which are regularly digested*; but he has constant uneasiness at the stomach; the stomach gradually loses its tone, the tongue becomes furred, the night is sleepless, slight fever supervenes. The locality of the pain, attended as it is with tenderness on pressure, the pain not having altered its place from the first, with such an history as I have supposed, explain the nature of the disorder, which may be cured by a vomit.

Indigestion, as a complaint, means a series of symptoms, which arise from the stomach being unequal to chymify food. The symptoms are, the appetite languid or voracious, generally irregular, sometimes as usual; a sense of weight, distention, pain, heartburn, supervening one, two, three hours, or later, after a meal, and in the worst cases often lasting till the contents of the stomach are thrown up, either not much changed, or with an acrid taste. Many persons eat a light breakfast, and go tolerably through the day; they then eat a light dinner, and warm their stomachs with two or three glasses of sherry; then with hot tea; and go to bed at eleven, and go to sleep; towards one, or two, or three, they wake with pain, distention, heartburn, which soda and *sal volatile* will not remove, and which opium only relieves injuriously; sometimes the stomach in the end conquers the meal;

generally the food is at last thrown up. There may be every degree of distress short of what I have described, attended with every kind of sympathetic disorder;—uneasy sensations and action of the heart; cough, dry, ringing, characteristic; a cloud over the spirits and the thoughts, and settled hypochondriasis.

The present is not a treatise on stomach complaints; still it may be useful to put the reader in possession of the principles on which the treatment of indigestion turns. In the case of a patient consulting a physician or surgeon, a little knowledge is not a dangerous thing, although the more he knows the better; the more he understands of the general nature of his complaints, the more exact will have been his observation of his own case; and the better, therefore, the evidence he will be prepared to lay before his professional adviser. It is conceivable that the diffusion of medical knowledge would be attended with additional advantage. It might perhaps in time put an end to such excesses of folly, on the part of the public, as have been displayed in reference to medicine, often, indeed, before, but most egregiously of late years; during which the vane of fashionable faith has capriciously veered from St.-John-Longism to Hahnemannism, while the index of humbler credulity has pointed with asinine patience to the pills of Morison, and the principles of Hygeism. "The lawyer," observes Lord Bacon, "is judged by the virtue of his pleading, and not by the issue of his cause. But the physician, and perhaps the politician, hath no particular acts demonstrative of his ability, but is judged most by the event; which is ever but as it is taken; for who can tell, if a patient die or recover, or if an estate be preserved or ruined, whether it is not of accident? * * In all times, in the opinion of the multitude, witches, and old women, and impostors, have had a competition with physicians."

The means by which indigestion is to be removed may be understood from the causes which have produced it; which may be,

1. Direct weakness of digestion, whether original and part of the constitution, or from excess, requiring careful regulation of diet, as to quality, quantity, frequency, time of meals, and the use of wine and medicine.

2. Sympathetic weakness, resulting from close application, neglect of exercise, neglect of medicine, determinable derangement of other functions.

3. Chronic inflammation of the lining membrane of the stomach, requiring leeches and blisters to the pit of the stomach, the greatest care in diet, mild mercurial alteratives, opium, lead.

4. Ulceration of the stomach, threatening perforation, and sudden death, requiring the application of similar means, modified by circumstances.

5. Cancer of the stomach, which, though incurable, may be mitigated,

VI. OF FOOD AT DIFFERENT AGES.

THE food of infants is immediately provided by nature. The milk, that forms it, is remarkable for its lightness and richness, it is bluer than the milk of the cow, has more cream (which will not, however, separate butter) and spontaneously deposits some curd on standing. Unless the mother is in strong health, it is best to have a wet nurse. In persons of a nervous temperament the very anxiety for the infant will often impair the quality orlessen the supply of its proper nourishment; and in the protracted and fruitless effort to nurse, the health both of the mother and of the child is liable to be seriously injured. Those infants are generally the strongest and the most forward, which are the latest weaned.

In the process of weaning, when children are delicate, asses milk, which comes nearest their former food, is an important auxiliary. Otherwise different varieties of farinaceous food, that, under various denominations, are prepared for the purpose, or good arrow-root, mixed with milk of the cow, are used.

Animal food is to be introduced earlier in the food of delicate than in that of strong children, if their stomachs will digest it; but for this there is no rule. In this, as in every other instance of medical management, each case is a new one, and what is best can be determined by trial only. That is the best food which is most easily digested, and on which the child thrives. The best animal food to begin with is beef-tea, thickened with arrow-root.

In general, forwardness of the teeth indicates a forward digestion; and as soon as the child can extract the juices of a mutton-chop, this food is well qualified for its occasional use. Animal food should not, however, be given to healthy children, under the age of three years, more frequently than twice a week.

Two faults are especially liable to be incurred in the management of young children. If the habit is inflammatory, the quantity of animal food which might otherwise be given advantageously, will produce heat, fever, fullness of the vessels of the head. On the other hand, farinaceous food, as it is justly considered to be less heating, and to be less nutritious, yet may in any habit easily be given in such quantity as to overload the stomach and bowels, and at once to irritate and to lower the system.

A child of a year old, and weaned, requires food for the next six months about six times in the day, and twice in the night. By the age of two years, a child should have discontinued taking food in the night, and about four meals are sufficient in the day: through boyhood the same number of meals is necessary.

An adult in full health requires two substantial meals, and often without prejudice partakes of two additional slight repasts, in the twenty-four hours. Women, more delicately organized, eat sparingly, and require three meals in the day.

Of the two hearty meals, which are necessary to men, use has determined that one shall principally consist of farinaceous, the other of animal food; and that the beverage with the first shall be coffee, tea, or cocoa; with the second, malt-liquor or wine. Some points in this arrangement are arbitrary, others essential. The beverage at breakfast used to be, and might as well now consist of, beer; coffee might be, indeed in many countries is, associated with the second repast in place of other stimulants. But if either repast is to be heavier than the other, and to be taken with wine, it is judicious to throw it later in the day, when the hours of ordinary business are past.

The whole of this arrangement is so far arbitrary, that the dinner might be with advantage as light as the breakfast. So light, indeed, men habitually make this repast, when it is to be immediately followed by business.

The wholesomest bread for BREAKFAST is stale household bread, with fresh butter; the least wholesome, muffins, which combine the faults of new bread and toast. However, until forty, or considerably later, a strong stomach makes no distinction between these aliments, if they are alternated. To most, again, new French bread is perfectly digestible.

Black tea is better than coffee, coffee than green tea: the two latter unnecessarily excite, and therefore indirectly debilitate the stomach and nerves. To make tea, the tea-pot should not be scalded, which causes the escape of some aroma: if you make it for yourself,—let the quantity of a breakfast-cup and a half of boiling water flow upon it, and pour the infusion out in two minutes. By this means you have all the flavour, without too much of the bitter principle of the tea. A large breakfast-cup of tea is all that any one requires. More produces wind, and weakens the stomach.

A fresh egg boiled from two and a half to three minutes, and a slice of ham or tongue, or the like, are a wholesome addition to the repast.

To those who reside in cities, the stomach is ready for breakfast by the time that the offices of dressing are gone through, nor is there any good, but harm, in delaying it. The breakfast should be so light as not to encumber the stomach or the system, or to interfere with any kind of exertion shortly after it.

The system often adopted on the Continent of taking a cup of strong coffee on rising, then giving some hours to business, and finally recruiting with a *déjeûner à la fourchette*, is a false one. The substitute of a stimulant for nourishment weakens the stomach. The disproportionate ravages of the cholera, at Paris, may be attributed to the inferiority of visceral stamina in the French, produced by less wholesome diet than our own.

In persons with weak stomachs no meal requires to be more studied than breakfast. If the stomach is overloaded at the commencement of the day, or if anything unwholesome is taken, digestion is deranged, and the stomach will not be right again for hours. The quantity of liquid, its nature, whether tea, cocoa, gruel, asses' milk, &c., of solid, whether dried toast, rusk, biscuit, with or without ham, bacon, scraped beef, &c., require attentive management.

In growing children in whom the strumous diathesis prevails, digestion is weak, and the appetite for breakfast often entirely fails; it is useful in such cases to give some savoury meat to provoke the stomach to relish a moderate repast.

If one who breakfasts at half-past eight and dines at half-past five or six, is hungry at one or two, he had better eat a LUNCHEON; a sandwich with or without a glass of sherry is the best. It is better not to make a luncheon a meal of habit; but to take it only when the appetite tells that you require it. Here an opportunity occurs of advantageously varying the frequency of meals.

The two principles to regulate the repast of DINNER are moderation and variety;—to dine one day on a single dish, another on several; one day to make cold meat part of dinner, another to shun it. As a general rule, all puddings and pastry should be avoided: the diner has already had enough; and these, in themselves, are less digestible. A single glass of good beer at dinner, and three glasses of sherry, madeira, or port, afterwards, are amply sufficient.

The hour of dinner should be neither too late nor too early: if too late, the system will have been exhausted for want of it, will be weakened, and the digestion enfeebled; if too early, the stomach will crave another substantial meal, which, taken late in the evening, will not be digested before the hours of sleep. A person who breakfasts at nine, should not dine later than six.

The rule for TEA after dinner is very simple. To those with whom it agrees, it is pleasant and refreshing; but two cups are sufficient; more than that quantity of fluid weakens the stomach. Nothing can be more pernicious than using tea or coffee to enable the mind, when already exhausted, to continue toiling late in the night. (The best receipt, however, for this purpose, is whiskey-punch made with green tea.) Wine is wholesomer, taken in great moderation, a glass occasionally, than either strong tea or coffee. Such a custom, however, should never be indulged in: it is exhausting the resources of health and life.

Tea, as a meal, has this advantage; if the dinner has been too light, a slice of bread and butter taken with tea, will make up for the deficiency, and render supper unnecessary.

VII. Social Relations of Food.

There remains another point of view, under which the subject of diet may be regarded. Nature has thrown so much gratification (to those, at least, who have good stomachs and discriminating palates*) around the social board, that we are tempted to ask, whether we are designed to content ourselves with what is simple, nutritious, and enough, and may not allowably indulge a little in pleasures, certainly not very elevated, but which the majority seem agreed not to despise. To what extent are the pleasures of the table a rational object of serious consideration and pursuit?

The prodigality of Nature towards us on this occasion does not authorise us to abuse her gifts by excess. She has indeed implanted in all a principle, which, if sufficiently recollected, would be a safeguard to us,—the strong wish for life, protracted, without suffering, till the last resources of our mortal being are expended. But excess in the pleasures of the table abbreviates existence, and clouds it with periods of bodily ailment, mental depression, discontent, and self-dissatisfaction. Such is the price which must be paid for repeated draughts from the cup of social indulgence filled to overflow. Add to this the reflection, (looking to the senses alone,) that the most exquisite and elaborate repast does not carry with it, for those who can command it, half the physical gratification which simply slaking thirst and appeasing hunger, when brought on by healthy habits and exercise, convey. Lest any one should doubt the truth of the last reflection, I extract two passages from former numbers of the *Quarterly Review*, which will bring home to the imagination of the reader the pleasures which I would compare. The first deserves a place in a chapter in an English work upon diet, in a national point of view, as vindicating our pre-eminence even in cookery *:—

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* Cui cor sapit, ei sapiat palatus.—*Cicero.*

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* It is true that the masters of the art are foreigners; but the talent which we foster we naturalize. Who (*si parvis liceat componere magna*) thought, or thinks, of West or of Brunel but as Englishmen? Accordingly West was President of the Royal Academy, and Brunel has been Vice-President of the Royal Society. I remember (if I may be pardoned introducing the anecdote,—it relates to nationality,) hearing Mr. Brunel remark, that nothing had more astonished him than the energy, hardihood, steadiness, and silence, with which he had seen the workmen under his direction encounter the most imminent personal danger, which they were perfectly aware of, and might justifiably have shrunk from. He expressed his belief that no nation in the world could produce the same quantity and style of courage. The best of the men, he added, were Cornish miners.

"It seems allowed on all hands, that a first-rate dinner in England is out of all comparison better than a dinner of the same class in any other country; for we get the best cooks, as we get the best singers and dancers, by bidding highest for them; and we have cultivated certain national dishes to a point which makes them the envy of the world. In proof of this bold assertion, which is backed, moreover, by the unqualified admission of Ude, we request attention to the *menu* of the dinner given in May last to Lord Chesterfield, on his quitting the office of Master of the Buckhounds, at the Clarendon. The party consisted of thirty; the price was six guineas a head; and the dinner was ordered by Comte d'Orsay, who stands without a rival amongst connoisseurs in this department of art:—

'*Premier Service.*

'*Potages.*—Printannier: à la reine: turtle.

'*Poissons.*—Turbot (*lobster and Dutch sauces*): saumon à la Tartare: rougets à la cardinal: friture de morue: white bait.

'*Relévés.*—Filet de bœuf à la Napolitaine: dindon à la chipolate: timballe de macaroni: haunch of venison.

'*Entrées.*—Croquettes de volailles: petits pâtés aux huitres: côtelettes d'agneau: purée de champignons: côtelettes d'agneau aux pois d'asperge: fricandeau de veau à l'oseille: ris de veau piqué aux tomates: côtelettes de pigeons à la Dusselle:

chartreuse de légumes aux faisans: filets de cannetons à la Bigarrade: boudins à la Richelieu: sauté de volaille aux truffes: pâté de mouton monté.

'*Côté.*—Bœuf rôti: jambon: salade.

'*Second Service.*

'*Rôti.*—Chapons, quails, turkey-poults, green-goose.

'*Entremets.*—Asperges: haricot à la Française: mayonnaise d'homard: gelée Macedoine: aspices d'œufs de pluvier: Charlotte Russe: gelée au Marasquin: crême marbre: corbeille de pâtisserie: vol de rhubarb: tourte d'abricots: corbeille des meringues: dressed crab: salade au gélantine:—Champignons aux fines herbes.

'*Relévés.*—Soufflée à la vanille: Nesselrode pudding: Adelaide sandwiches: fondus.—Pièces montées, &c., &c., &c.'"

The sketch which I would oppose to the preceding full-length portrait of a superb dinner is the following:—

In a training establishment, in most cases, the horse reposes in the same chamber with the stable-boy. This is on a principle of prudence rather than of economy. Horses in high condition are given to roll in the night, and get cast in their stalls, and here assistance is at hand; as by the means of stirrup-leathers buckled together, they are extricated from their awkward position by the joint efforts of the boys. We have been told that an interesting scene takes place on the wakening of the boys in the morning. The event is anxiously looked forward for by the horses, who, when they hear them, awaken each other, neigh, and denote their eagerness to be fed, which is the first step taken. The second is a proper arrangement of their beds, and then dressing and exercise. When they return home the horses are well dressed again ; the boys then break their fast ; and Holcroft spoke from experience when he said, "*Nothing can exceed the enjoyment of a stable-boy's breakfast.*"

It will not, I think, be doubted that the predominance of gratification belongs to the second instance,—with this advantage, that the stable-boy is the better for his breakfast, whereas it is not improbable that the partakers of the splendid repast of which I have copied the *charte*, were individually the worse for the epicurean indulgences to which it led. It appears to me a logical inference that pleasures which, while they peril the health, are of the same kind, and not equal in degree, with a stable-boy's breakfast, ought not to be an object of serious concern to a rational being.

The pleasures of the table, however, when used in moderation, admit of some defence ; they promote social intercourse. Man, unlike animals, is in best humour when he is feeding, and more disposed then than at other times to cultivate those amicable relations by which the bonds of society are strengthened. The influence of this principle is more acknowledged in England than in any other country. With us no public meeting is valid without a dinner; no party leader is chartered in public estimation, till his services have been anticipated or acknowledged, and his public principles pledged, amidst circling bumpers and convivial cheers. Even charity obeys the same law; and the beneficent institutions for the sick, and the lame, and the blind, find increase of prosperity in their annual festive celebrations*.

This disposition of our countrymen is partly attributable to their affluence, which renders the burden of such entertainments light, partly to the practical character of the English, partly to the prevalence of the nervous temperament. We are not easily brought together to do nothing; our pleasures, our amusements, are of a more strenuous character than those of our neighbours, and distinguish an Englishman, not less than the power-loom, and the rail-road, and those strides of mechanical invention, the physical material of which has been wittily said to prove that this age of iron is the true age of gold.

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* For example, at each recurrence of the annual dinner of the Middlesex Hospital, His Most Gracious Majesty, Patron of the Hospital, has munificently bestowed one hundred guineas; His Grace the Duke of Northumberland, the hereditary President, who has, besides, often taken the chair on this occasion, one hundred pounds: nor are these regal and princely gifts unseconded.

Some one remarked of a fire in a room, that it has one eminent advantage,—it gives you a motive for selecting and remaining in one part of it. It is the same with a dinner,—it takes you into society, and keeps you there. Rousseau, who felt the irksomeness of meeting for conversation in society without an object, where this resource was wanting, was used to take a knitting-needle and a ball of cotton, to occupy and amuse himself with. The dinner-table does this for that cast of temperament which belongs to the shy and the fidgetty. The banquet temporarily remedies his constitutional tendencies.

For those who carry into society something more than a good digestion, who, to minds stored with useful information, unite good humour, good sense, and good breeding, and who find in society the same elements which they bring, the festive board which assembles them sparkles with wholesome recreation. In that case, Liber Pater sheds an influence which is divine; and the host who brings together *well-assorted* guests in the numbers of the graces or the muses, if only a mortal Amphitryon, yet dispenses and partakes of ambrosia.

The greatest pleasure in life is the society of a friend, with whom, in unrestrained exposition of one's thoughts, one may unravel and disentangle each skein of knotted prejudice and many-coloured opinion. In such intimacies, however, cultivated exclusively, what Lord Bacon termed *idola specûs* are sure to be worshipped. The principles may be right, the understanding may be sound, but the world is viewed from a single point, and to a certain extent inevitably erroneously. A true estimate of mankind and of the value of human pursuits, can alone be formed by one who corrects his closest speculations by the collective judgment of society.

Intercourse with general society should not, perhaps, be too frequent; or time is absorbed, which ought to be given to more serious objects. It is pleasure,—and pleasure soon palls. Pleasure is the most agreeable relaxation,—the hardest business. The pleasures of society are like other pleasures; and such scenes as are figured in the following extract from Sir Walter Scott, would as certainly, by constant recurrence, have become faded and dull, as in their occasional celebration they must have proved full of entertainment, and equally conducive to health of body and mind.

" The Burnett, whose taste for the evening meal of the ancients is quoted by Mr. Pleydell, was the celebrated metaphysician and excellent man Lord Monboddo, whose *cœnæ* will not easily be soon forgotten by those who have shared his classic hospitality. His philosophy, as is well known, was of a fanciful and somewhat fantastic character;

but his learning was deep, and he was possessed of a singular power of eloquence, which reminded the hearer of the *os rotundum* of the Grove or Academe. Enthusiastically partial to classical habits, his entertainments were always given in the evening, when there was a circulation of excellent Bourdeaux, in flasks garlanded with roses, which were also strewed on the table, after the manner of Horace. The best society, whether in respect of rank or literary distinction, was always to be found in St. John's street, Canongate. The conversation of the excellent old man, his high, gentlemanlike, chivalrous spirit, the learning and wit with which he defended his fanciful paradoxes, the kind and liberal spirit of his hospitality, must render these *noctes cœnæque* dear to all who, like the author (though then young), had the honour of sitting at his board."

Chapter II.

OF EXERCISE.

The living machines, which Nature frames, agree in this respect with engines of human construction; they are worn and consumed by use. But they differ in another,—inaction is not less fatal to them*. Use, which at every instant impairs and takes something from the steam-engine, for a long period invigorates the frame and sinews of a labourer. The same law pervades the whole organism: the mind, like the body, is strengthened by exertion. We have at present, however, only to do with the employment of the mechanical powers of the frame, the use of which is emphatically called EXERCISE.

To form an idea of the mechanism of voluntary motion, the reader is to suppose that the ends of the bones are accurately adjusted to each other; some as plane surfaces, others as hinges, others as balls and sockets; and that they are so tied together by ligaments that they cannot fall asunder, or move but in those actions for which their surfaces are fittingly shaped. The motions of the body are the play of its different joints. That play is determined, or the joints are either moved to a succession of positions, or permanently fixed and maintained in one, by the action of the voluntary muscles. These extend from bone to bone, passing over the joints, which they move or fix through their power of instantaneously shortening, or becoming rigid, through mere volition. The examination of a single joint will serve to explain the conditions belonging to the motions of all.

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* I have known several instances in which the muscles of a limb have been rendered weak and powerless for months, in consequence of their incautious *disuse*. In one case, and that a young person, a limb was thus irretrievably palsied.

The elbow forms a perfect hinge. Of several muscles disposed about it, it will again be sufficient for my present purpose to consider two alone. One of these is situated in front, and bends the joint; the other behind, which extends it. Each of these is a thick band of flesh, which is attached to the arm-bone above, to a bone of the fore-arm below. It consists of fine threads, which are disposed parallel to each other, and lengthways in reference to the arm-bone. These parallel threads, when in repose, describe straight lines. When we desire to exert them, the will transmitting an influence along the nerves, suddenly throws each of the threads into a zigzag line. But the ends of the same thread bent into a zigzag must be nearer than before; and as they are attached each to a point of a different bone, these points of the two bones must be approximated. So it follows that the action of the muscular threads on the fore-part of the arm bends the elbow, while that of the muscular threads disposed behind the arm-bone is the reverse. By a voluntary effort, we can maintain either of these sets of threads in zigzag lines, with angles more or less open, determining thus the duration and degree of the flexion or extension of the joint at our pleasure.

Every other position, gesture, action, of the body is similarly performed.

Now if we keep the elbow bent at a right angle, we may sustain in the hand a considerable weight; the force which supports it is the strength of the muscular threads, acting vertically upon the bones of the fore-arm. Substitute, in idea, for these threads a skein of silk; it would equally serve, attached as the muscle is, and being of the same length, to support a moderate weight. But the threads would become frayed and strained by use, if often employed to support this weight; and one or other breaking, would diminish in number. The parallel threads of the muscle, on the contrary, not only appear individually to strengthen by use, but, what is more wonderful, they become more numerous; the whole muscle acquires an increase in volume through the increasing number of its constituent threads. It is, however, to be understood, that exercise, to be salutary, and to strengthen, must have its limits. Immoderate exercise will fatigue, exhaust, and permanently weaken the same muscle, which moderate exercise would have developed, and which inexertion would have rendered powerless and useless; the extreme effects the same, the mean the best.

The temperate exercise of the muscles has other directly local effects, that are equally beneficial. The bones become larger and harder, the sinews about the joints stronger; the blood circulates with more vivacity; the contents of the veins are driven onwards to the heart by the pressure of the contracting muscles, and so room is made for a quicker supply of arterial blood, on which nourishment depends. Thus it is well known that in bleeding in the arm, if the blood does not flow briskly, the patient has only to open and shut the hand, in other words, to use the muscles of the fore-arm, and the stream is freer.

Nor does the enlargement and strengthening consequent on exercise, include those parts alone which minister to locomotion. It is certain that the play of the chest, and its freer and more extensive motion, contribute to strengthen the lungs. The left side of the chest is habitually less exerted, whether from original inferiority of developement, or otherwise, than the right; and of the whole left side, the upper part has the least play and action. The upper part of the left lung, which has thus the *least* mechanical motion given to it, is likewise the part which consumption first attacks.

To exemplify the same law, another part of the respiratory apparatus may be used, to which exercise, given without thought, causes it to be developed, not beneficially, but to the prejudice of personal appearance. If a young man thoroughly gives in to the habit of taking snuff, the aperture of the nostrils becomes sensibly longer, wider, and more vascular; the organ, enlarging with the mechanical exercise it takes, becomes, like the habit, preposterous.

Such are the effects of local exercise,—to develope the resources of growth, and to invigorate the circulation. Suppose the exercise not local, but general; —the entire frame expands and acquires vigour, the venous circulation is disembarrassed by the continual propulsion of the blood towards the heart, the heart's action is more free and strong, the animal temperature is raised, the breathing is improved, superfluous fat disappears, transpiration is promoted, the skin becomes fine and clear, and the mind, partaking of the elasticity which the body acquires, is disposed to serenity and cheerfulness. An agent, which can produce in the frame effects so salutary, must well be deserving of careful study.

The rules of exercise may be considered under four heads, as they apply to the sports of boys, the education of girls, the habits of adults, and the wants of age.

It may be well, however, preliminarily to explain, that there are certain conditions, without which exercise does not carry with it the full share of benefit it is calculated to produce.

In the first place, Air and Exercise should go together. The same bodily exertion in a close room does not refresh and invigorate as when taken in the open air; in a street, as in the fields; for there are many degrees, of which, however, the lowest is still a good. A walk in the streets of a metropolis is better than sitting at home, although not equal, in the renovation it affords, to a walk or ride in the country; an hour's fencing at Angelo's or Hamon's is far better than an hour passed at a chess-club, although not equal to a match of cricket at Lord's.

Secondly, Exercise to be thoroughly beneficial requires a mind at ease. Exercise taken in the performance of professional duties hardly tells restoratively,—it fatigues without strengthening. Even a walk or a ride, alone, taken for the sake of exercise, is wonderfully unrefreshing. The mind must be cheerful and amused, that exercise may do its salutary office.

Thirdly, Exercise must bear a proportion to the other calls upon the strength. It is itself exhausting; but when the system can bear it, the reaction which follows is strength. Care, therefore, must be taken not to exhaust the entire capital from which nature recruits herself. The capabilities of the frame may be drawn upon in many different ways, but all contribute to the same exhaustion. Every one rises in the morning with a certain quantity of disposable force, or, to use a common expression, of nervous energy. This may be consumed in bodily exercise, in study, in mental anxiety, even in digestion; the student, who has been busily employed at his desk all the morning, in the afternoon rises from his chair with tired legs; he has as yet taken no exercise, but in another way his strength has been drawn upon, and the long walk, which otherwise would invigorate, would now exhaust only and fatigue.

The following is a paradoxical instance of exhaustion produced on the principle which has been explained; when the opposite effect would have been anticipated:—

Captain Franklin, speaking of an occasion when his party, worn with cold, fatigue, and famine, had the fortune to kill a cow out of a herd of musk oxen, observes, "This was the sixth day since we had had a good meal; the *tripe de roche*, even where we got enough, only serving to allay the pangs of hunger for a short time." "We were detained *all next day* by a strong southerly wind and snow. We restricted ourselves to one meal this day, as we were at rest, and there was only meat remaining sufficient for the morrow." The consequence, however, of this temperate indulgence in fresh and nourishing food was, that on recommencing their toils, " the whole party complained more of faintness and weakness than they had done before; *their strength seemed to have been impaired by the recent supply of animal food.*" It is evident that the nutriment which the worn party had received from their two days' good meals, had not made up for the direct exhaustion produced by the call upon their digestive forces to chymify so much animal food. Their stomachs had consequently tired their legs and arms.

Exercise of Boys.—Young animals have a natural disposition towards bodily exertion ; they frisk and bound in a thousand gamesome ways, finding a reason in everything for indulging their sportive humour. It is enough that they have life and are young, to lead them to perpetual motion. It is the same with children, whose noisy play springs from their exuberant spirits, which are beneficently given them for their enjoyment : but not for that alone, but to supply motives for the requisite practice and strengthening of their limbs, their body, their lungs.

The games of boys are well adapted to their physical condition, and the first lessons they have to learn. Their frame is light as yet ; they have to learn to carry it about, and transport it from place to place ; to exercise their legs, rendering them by use secure and ready implements of locomotion. The perpetual falls of children (for their protection against which the ends of their bones are as yet a soft cartilage only) show that they are but learners how to walk, run, jump. The appropriate games of their age are games of running, the hoop, prisoners' bars, and the like.

To these the military exercise is a good adjunct, which completes their knowledge of walking, else liable to be careless and slovenly, giving their carriage uprightness, firmness; to their step precision; —the frame raised to its full height, perpendicular; the shoulders well thrown back, the head erect;—in motion the limb advanced straight, the toe pointed outward, the whole limb inclined inward to keep the line of progression straight, the body poised for an appreciable period in the measured step upon the opposite limb,—a physical lesson of great use, but from prescription overrated*. We admire it in its result:—the extended line of soldiery, its exactness, its pliancy, the precision of its simultaneous movements, nothing inharmonious, out of place, or interfering. But we forget that the character of the whole does not belong of necessity or likelihood to its individual parts: a sword-blade is flexible, elastic; but cut it into a dozen cubes, each would be hard, square, rigid. The line of soldiery is a machine, and the soldiers are its constituent parts. The training of each is for the co-operation of the whole, not to promote individual variety of strength and action, not to bring out in each all the resources of his frame. Contrast the single soldier, detached from the line, with an Indian warrior; in the gestures, and crouching and supple walk of the latter, —the body playing upon its bent joints as upon springs, each posture elastic, prepared to throw out on the instant all the energies of the frame, promising the agile bound of the panther, it is evident that for every purpose of attack or evasion the Indian is individually the best fitted, as he so much the more completely commands the resources of his muscular frame. There is nothing in what is called the military exercise which brings these qualities out. They have to be learned in some other school. This school is not exactly what are called gymnastics; the exercises which pass under that name are inappropriate to boys; to the strongest, indeed, they do no harm, or may not; but children not the strongest are liable to be strained by them and to have the seeds of permanent structural weakness sown by their influence. The same objection does not apply to systems of exercises, in which the frame is thrown into a succession of attitudes, with gestures of more or less rapidity or force. Any quantity of exercise may be thus obtained; and there is this safety in such exercises, that we may be sure

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* I speak with reference to what is commonly understood by the expression, military exercise, not of the varieties of gymnastics which have been of late years judiciously introduced into the drill of the army.

Nature has not overweighted the body; and this advantage, that by means of an organized system of exercises, every class of muscles, every region of the trunk, each weaker or neglected part, may in its turn be submitted to strengthening discipline.

As boys advance in age, their frame fashions itself to a new character, and new elements of strength are put forth. The chest expands, the arms become firm and muscular. The sports of young men are correspondingly altered; cricket now, and rowing, single-stick, fencing, tennis, well fitted to draw out the resources of the frame, appropriately take their turn.

In the practice of such exercises, it is desirable to recollect that Nature has made the left side of the person the feeblest, and that the customs of society discourage its use on anything like an equality with the right. The occasion, therefore, is not to be neglected, which such sports afford, of strengthening the weaker part; so in these exercises, in fencing, single-stick, tennis, the left hand should be frequently used in alternation with the right. I have already given the best reason for strengthening the left side of the body; but that applies to delicate frames alone. To the strong, it has this advantage, that their physical powers are positively increased; which is desirable while their frames are perfect,—and still more so when, as it may occasionally happen, the right arm is temporarily disabled.

Dancing can hardly be recommended as an exercise; although as a source of social amusement it has a high value. As a means of forming the carriage of the body it is also excellent. Locke himself recommends that children be taught to dance as soon as they are capable of learning it, for this purpose,—and because it gives children manly thoughts. Certain it is that the carriage of a child cannot be improved without its character profiting*.

Physical Education of Girls.—Girls, as children, are healthier than boys. This fact, which, if it has not been anywhere remarked, is indisputable, may be accounted for in the following manner. Girls, as young children, are nearer in mind and body what they are to be permanently, than boys. Their shape has less to alter, (the pelvis being already in early childhood proportionately larger,) their voice, complexion, delicacy of skin, have hardly to be modified. It is presumable that their caste of temperament, thus early decided, not temporary, unsettled, or intended for further material change, has a strength in its anticipated maturity, which the childhood of the opposite sex does not possess.

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* Dancing will probably not again contribute to make a Lord Chancellor; but some of the advantages which we learn that the possession of the art conferred in the East, it may still convey, even in England.

"Their conversation (continued the princess Scheherazade) happening to turn upon diversions, and the different ways of making merry, the calenders arose, and danced after their fashion; which augmented the good opinion which the ladies had conceived of them, and procured them the esteem of the caliph and his companions."——*Arabian Nights,*—the thirty-third.

There is but one disease to which female children are liable, and that is Education; as soon as the age arrives at which they are to be artificially trained to feminineness of mind and manners and accomplishment, their strength and health are endangered. While boys are encouraged to pursue sports of increasing exertion, their sisters, whose bodily strength not keeping pace with theirs, nevertheless *requires exercise equal in proportion* for its maintenance, are forbidden all that they need. The consequence is, that they are liable to become fragile and delicate. How their health is progressively impaired, this is not the place to teach. It is my present object only to point out in what its alterations originate, and how they may be prevented. But there is one alteration which follows so immediately and mechanically from neglect of exercise, and which tends so completely to counteract the objects for which the system of artificial culture is pursued, that I may not pass it unnoticed. This is weakness of the back followed by curvature of the spine.

I enter indeed upon this subject the more readily, that it has not been adequately explained even by the latest writers. Every one is indeed aware that general weakness of the entire structure of the back is the consequence of the neglect of exercise; but how it happens that that weakness produces lateral curvature, I think has not as yet been shown. All again are aware that vertical pressure is insufficient to produce the effect observed; this might cause the bones to become broader and flatter, but could not bend the back laterally. The difficulty has been to get at the origin of lateral curvature: or to bring the back into that kind of sinuous flexure, in which common pressure would cause the weakened column to become serpentine.

The first feature in the inquiry, which presents itself, is the almost uniform elevation and fulness of the *right shoulder, and right side of the chest*, which accompanies curvature of the spine. Why this feature is not universal will be subsequently explained. But for the present let us attend to the fact of its remarkable frequency.

The principle, to which this will be traced, is thus expressed by Donald Walker,—"*The one-sidedness with which almost all the acts of life are performed, is the general cause of the greatest and most universal deformity*, and its prevention requires an equal and similar use of the other side." Hitherto, however, the connexion between the general fact, and the common feature of spinal curvature has not been shown.

Mr. Coulson, in a recent work upon this subject, animadverts upon the views propounded by the late Mr. Shaw.

"In consequence," says Mr. Shaw, "of the alteration in the state of the shoulders being the first symptom of deformity observed, it is generally but erroneously supposed that the dorsal part of the spine is the first distorted. Indeed those who have lately written on this subject have fallen into this error, and have described the curve at the loins as the last which is formed.

"In cases of diseased vertebræ there may be a curve only between the shoulders, but it invariably happens in the common lateral curvature, that where one shoulder is protruded, there is also a curve at the loins; and I have shown by diagrams in the preceding volume that this curve is not only the first formed, but that those in the upper part of the spine are consequent upon it."

Mr. Coulson observes upon these passages, that those who describe the curvature in the loins as the last which is formed, "are right, though they did not clearly see the cause," and adds, that Mr. Shaw's practical observations tended, "in spite of his hypothesis, to prove that the first curve is formed at the right shoulder."

It is evident, therefore, that while Mr. Shaw attributed the initial curve *to the loins*, Mr. Coulson is disposed to look for it *in the back and shoulder*. The latter writer, however, puts forward, with a full general conception of its importance, the principle already quoted,—the general influence of the rightsidedness of our habits upon curvature of the back.

But neither Mr. Shaw's nor Mr. Coulson's ideas are strictly just. *The two curvatures are not successive, but necessarily simultaneous*; neither has priority; in health and strength both of these curvatures, producing serpentine flexure of the spine, continually occur, and disappear with the next change of posture. In the weak, they become permanent, and are progressively aggravated.

To trace the mischief in its progress;—

The steps by which the spine ordinarily gives way are these. The child kept at its music-stool, or books, or drawing, has a weakened and aching back. The muscles of the spine have not been invigorated by the sportive exertions, and the various changes of attitude, which nature dictates. Wearied by its task, the next change is to stand listlessly beside its governess, or in a drawing-room. What is the posture which it assumes? It is of course that which gives greatest ease to the languid muscles. The child stands with its weight supported upon one leg, the body swayed to that side, the knee of the other side bent, and the hip lowered. The limb which it uses on this occasion for support is almost always the *right* limb; for this simple reason, that it is the strongest. And the child assumes the position at all times, because it is one of change from its former more rigid position, and because, in addition, the fascial structure of the limb takes off, in that posture, some of the strain from the muscles.

Let me, in passing, observe, that what has been already said, sufficiently indicates the source of one minor kind of displacement, that is not unfrequent. The right ancle constantly rested on *grows* inwards,—that is to say, the joint *gives* inwards, its ligaments being elongated by the perpetual strain. In like manner, or from the same cause, the knee will give inwards,—one limb becoming in-kneed.

The child thus weakened by its habitual inexertion, and tired by the discipline of the morning, is standing supported on its right leg. To judge of what is happening to its back at the same time, place before you a healthy child, and having instructed it to rest its weight alternately on both its legs, and, as in the position supposed, upon one only, observe its back when the alternation to the latter takes place. You may distinctly see that the straight line of its back becomes, in the second case, a serpentine flexure, *the ordinary flexure of curvature.* The mechanical elements of the change are equally obvious. At the time that the weight of the frame is transferred to the right limb, the left side of the pelvis is seen to sink; but the spinal column is attached at right angles to the middle of the pelvis; if the whole length of the column continued vertical to its base, the child would have fallen towards the unsupported side; the column, to avoid this consequence, is instinctively bent at the upper part of the loins to the right, to throw the weight well over to the right side; but the degree of flexion required for this purpose would carry the neck considerably out of the perpendicular; another contrary bend is therefore requisite, which begins in the middle of the back, and terminates at the root of the neck. These are the elements of the simultaneous changes which ensue,—the inclination of the pelvis to the left, the flexure of the lower part of the spine to the right, of the upper part towards the left. They may be thus experimentally produced in the flexuous spine of the healthiest child, as quickly redressed, and the spine restored to straightness. *They are thus likewise inseparable, not successive, but simultaneous parts of one action.*

Let us now apply the preceding observations to children with backs weakened in bone, sinew, muscle. This position of rest, this standing-at-ease, to which they are more prone than other children, and which becomes habitual, brings the spinal column into the following relation to the weight of the body, arms, and head. It is no longer a straight pillar of support; but, so long as the posture is maintained, a flexuous one. That would matter little, if all the elements of the column were strong and rigid. But they are weak, debilitated, disposed to yield, and they give accordingly; and the flexures become, not the temporary yieldings of elastic joints, but permanent givings and yieldings of weakened textures. Once begun, the change can but progress, and the greater the obliquity at each part, the greater the mechanical inability of the spine to resist the growing evil.

The only difficulty that remained in the theory of spinal curvatures was that which I have attempted to explain. When a curvature of the spine in the back is *convex* towards the right side, it necessarily follows that the right shoulder will be elevated, that the right side of the chest will be fuller, that the left shoulder will drop, the left breast be flat.

It is easy, again, to understand how the case may be exactly reversed; how the habitual inclination may be to rest on the left leg, with a parallel train of consequences.

Again, it is evident that the serpentine curvature, the *common* origin of which I have explained, may be favoured by or even entirely proceed from other causes; how an invalid in bed may be bent with a convexity towards the side on which she lies;

how the spine may be twisted slightly on its axis by one or other habitual motion; how the posture employed in writing or drawing may give rest and pressure to one side and shoulder, expansion and elevation to the other; how the trivial circumstance of the dress of children hanging on their shoulders, and so contrived as to be always ready to fall off, will almost necessitate the practice of perpetually hitching up one shoulder to support the dress, and of letting the other drop within it.

The description of the steps by which weakness of the back leads to curvature, explains at the same time the means of preventing the latter, or of remedying its early threatenings.

1. In the first place, a child should be broken of the habit of standing on one leg in preference to the other. It should be made to stand on both alternately. Mr. Jenkins, whose ingenious instructions have been of so much use to the youth of the last five-and-twenty years, observed to me that there was one sure receipt for producing crookedness: "For this purpose," he remarked, "a child should bolt its food, and habitually stand on one leg:"—the evils proceeding from the mischievous combination of bad digestion with faulty habits of posture, are well conveyed in this apophthegm.

2. All other postures are to be avoided which tend to give predominance or inclination to one side.

3. Exercises which promote the strength of the back should be systematically employed; exercises, however, in which the limbs are not weighted, but which consist in the assumption of a succession of attitudes. Much natural grace, and ease of posture and gesture, are collaterally obtained by such practices, when judiciously selected. To mention one that is highly useful;—suppose the child to stand with its feet together, and with its face turned against the low end of a sofa the level of which reaches some way above its knees; let it then raise its hands to meet above its head, and bring them down to the horizontal line of its face; and then let it bend the body forward till the hands touch the sofa, and rise again, and repeat the exercise several times in succession.

4. The dress of a girl should not bind her chest, but should be, in fact, as light and incompressive as that of a boy, and as much indulgence in play and sportive amusement allowed, as may be consistent with the habits it is right to encourage.

5. In sitting, when already tired, the child should rest well back on her chair, the spine resting against the back of the chair, thoroughly supported by it, and the seat of the chair reaching to the bend of the knees. Her feet should be equally supported.

Such are the precautions necessary to be observed against spinal curvature; and they are sufficient to prevent it. To remove it entirely, when it exists to any great extent, is impossible; to remedy it in part during growth always practicable; to obliterate it at its commencement, not less so. The partial introduction, however, of other principles of treatment becomes necessary, where curvature has begun.

In a note to an excellent article on physical education by Dr. Barlow, of Bath, in the Cyclopædia of Practical Medicine, Dr. Forbes adds, of his own observation, that in a school which he had inspected, not one female child that had resided there two years, had a straight spine!—a serious comment on the text,—not to exclude from the education of girls that enjoyment of air and exercise which nature claims for them.

II. Of the Exercise proper for Adults.

> "The wise for health on exercise depend;
> God never made his works for man to mend."

Cicero is described by Plutarch as being, at one period of his life, extremely lean and slender, and having such a weakness in his stomach that he could eat but little, and that not till late in the evening. He travelled to Athens, however, for the recovery of his health, where his body was so strengthened by gymnastic exercises, as to become firm and robust; and his voice, which had been harsh, was thoroughly formed, and rendered sweet, full, and sonorous. Of Julius Cæsar, the same author informs us that he was originally of a slender habit of body, had a soft and white skin, was troubled with pains in his head, and subject to epilepsy; but by continual marches, coarse diet, and frequent lodging in the fields, he struggled against these diseases, and used war, and the exercises and hardships therewith connected, as the best medicine against these indispositions.

Sydenham exemplifies the utility of exercise, by the case of a learned prelate (Dr. Seth Ward, bishop of Salisbury), who having applied himself intensely to his studies for a long time, was at length seized with a hypochondriac disorder, which, by its long standing, depraved all the ferments of the body, and destroyed the digestion. After having tried all sorts of medicines in vain, he was at last persuaded by Sydenham to try riding on horseback, beginning with short journeys, as best suited the weak condition to which he was reduced, but gradually lengthening them as he gained strength, and not to mind either meat or drink or the weather, but to take up such accommodations as are to be met with upon the road, like a common traveller. In short, he continued this method, till at length he rode twenty or thirty miles a-day, and finding himself much mended in a few days, he was encouraged by this wonderful success to continue this course for several months, in which space of time he had rode many thousand miles; so that at length he was not only free from his disorder, but became strong and brisk*.

Mr. Holcroft, in his answers to Sir John Sinclair upon the subject of training, observes, "The experiments which I have made upon myself, though they never have been followed with perseveranee and consistency, tend to prove that exercise, at every period of life, is greatly advantageous, *provided it be not taken to excess;* it seems as if it might be gradually increased to what would be thought a wonderful degree, even in old age; and that with its increase the faculties strengthen, and an approach to youth returns."

It is a common impression that the effects of high training are attained at an expense of constitution; and that the frame, which is raised by constant exercise to its utmost strength, wears out the sooner for it. This appears to be erroneous. Sir John Sinclair says, "It is remarked that running horses when trained do not wear out sooner than other horses; on the contrary, they bear fatigue much better. Nor does training game-cocks shorten their lives; on the contrary, they live longer than common poultry."

The reader may be curious to know what amount and kind of exercise constitutes high training.

The principal objects for which, in this country, persons have submitted to this preparation, are feats of pedestrianism and pugilism; the training for both is nearly the same; its purpose, one which is technically called to improve the *wind*, that is to say, the power of sustaining continued exertion.

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* Swan's Sydenham, page 444.

The pedestrian, who may be supposed already in tolerable condition, enters upon his course of training with a regular course of physic; which consists of three doses (Glauber's salts are generally preferred, and from one to two ounces are taken each time, with an interval of four days). Having gone through this course of physic, he commences his regular exercise, which is gradually increased as he proceeds in training. When the object in view is the accomplishment of a pedestrian match, his regular exercise must be from twenty to twenty-five miles a-day. He must rise at five in the morning, run half a mile at the top of his speed up-hill, and then walk six miles at a moderate pace, coming in at about seven to his breakfast. After breakfast, he must again walk six miles at a moderate pace, and at twelve lie down in bed without his clothes for half an hour. On getting up he must walk four miles, and return by four to dinner. Immediately after dinner he must resume his exercises by running half a mile at the top of his speed, and walking six miles at a moderate pace after it. He should go to bed about eight.

After three or four weeks the exercise is still more severe. But besides his regular exercise, a person under training ought to occupy himself during the intervals in every kind of exertion which tends to activity; as cricket, bowls, and the like, in order that during the whole day the mind and body may be occupied.

The sensible effects produced by training, independently of the increased facility of muscular exertion, are the loss of fat, the increased size and hardness of the muscles, the skin becoming clearer, smooth, well-coloured and elastic. He can draw a deeper inspiration, and hold his breath longer than before; he feels himself light and *corky;* his mind is clearer, his attention ready, his perceptions acute.

Such are the well-attested and certain advantages attainable by any one not advanced in life and of a good constitution, through the judicious and systematic adoption of rules of bodily exercise. The condition of the body may be raised to a high tone of health and vigour, and the mind may be rendered clear, unclouded, cheerful. Unluckily this animal perfection can only be obtained at its price, (much time and leisure, namely,) which places it practically out of general reach. But there are some to whose occupations it is congenial; and it is interesting to observe, how highly it has been prized and fostered, and what a beneficial influence in an earlier stage of society was obtained by the cultivation of animal superiority, which seems under favouring circumstances naturally to ally itself with mental excellence.

Sully recommends, in the strongest manner, to military youth those sports and exercises which form a graceful carriage and give strength to the limbs:—"I was," says he, "always of the same opinion as Henry IV. concerning these exercises. He often asserted that they were the most solid foundation, not only of discipline and other military virtues, but also of those noble sentiments, and that elevation of mind, which give one nature superiority over another."

It is related by Herodotus, that when Xerxes invaded Greece, he found the Grecians employed in celebrating the Olympic festival, and that the prize for which they contended was no more than a chaplet of wild olive. Tigranes, the son of Artabanus, exclaimed, "Alas, Mardonius! against what kind of men have you led us to fight? men who engage in a combat with each other, not for gold or silver, but only for superiority of virtue and glory."

The Olympic games, re-instituted by Iphitus, 776 years B.C., were celebrated every five years. Ten months of preparatory training were requisite; of which one was devoted to exercise in the stadium in the presence of the judges, in order to qualify the competitor for the arduous trial. Free citizens only, whose characters were irreproachable, and who in other respects had complied with the rules of the institution, were permitted to contend. So important was the prize of victory, that none but men of spotless reputation were allowed to enter the lists, which were carefully guarded against the intrusion of unworthy or improper persons.

"To conquer at Olympia," says Cicero, "was greater and more glorious than to receive the honour of a Roman triumph."

There was scarcely a town of any consideration in Greece, and in her colonies settled along the coasts of Asia and Africa,—in the Ionian and Ægean islands,—in Sicily and in Italy, in which there was not a gymnasium, or school of exercise, maintained at the public expense.

The gymnasia were spacious buildings, of a square or oblong form, surrounded on the outside with piazzas, and containing a large area, where the exercises were performed. Places for training in bad weather,—porticoes, baths, chambers for oil and sand, with groves of trees, and seats or benches, encompassed the stadia. The internal structure of these edifices was adapted to the convenience of those who frequented them either for exercise or pleasure; and they were the resort of rhetoricians, philosophers, and men of learning, who here read their lectures, held their disputations, and recited their several productions.

The contests at the Olympic games were in running, leaping, wrestling, throwing the discus, boxing: the foot-race held the foremost rank. These are humble elements of national greatness. But in a voluptuous climate the propensity to indulgence is natural and powerful; and in the religion of the Greeks there was no adequate check to licentiousness. The games, diffused by multiplied institutions through the whole people, while they were often associated with the rites of religion, exerted a direct and important moral influence. In those who prepared to contend in them, they compelled the observance of temperance and sobriety. A natural association, or the skill of the lawgiver, or the taste of the people, connected with the severity of physical training the necessity of a blameless life and character. Sculpture, which had her studio in the gymnasium, gave deathless existence to the victor. Architecture raised her column and portico, which echoed to lofty philosophy, and from whence ascending, the music of the golden harp, celebrating the triumphs of heroes, floated around Olympian Jove.

Εὔ-
δει δ' ἀνὰ σκάπτῳ Διὸς αἰετὸς, ὠ-
κεῖαν πτέρυγ' ἀμφοτέρω-
θεν χαλάξαις,
'Αρχὸς οἰωνῶν· κελαινῶ-
πιν δ' ἐπί οἱ νεφέλαν
'Αγκύλῳ κρατὶ, γλεφάρων
'Αδύ κλαΐστρον, κατέχευας. ὁ δὲ κνώσσων
'Υγρὸν νῶτον αἰωρεῖ, τεαῖς
'Ριπαῖσι καταγχόμενος.

The real, stripped of the associated, utility of athletic exercises still remains.

The extent, however, to which they should be pursued, even by those who can command time, is endlessly various; so much depending upon temperament, habit, diathesis; so much on the powers of digestion; so much on the natural developement of the muscular frame; so much on the fortuitous customs of early youth; so much on the period when age, with its stealthy pace, first overtakes us: there is no doubt that many, forgetting that after forty their forces are declining, impair and exhaust them by taxing their digestive and athletic powers, as in youth they were used to do without detriment. Looking to the whole human race, it is certain that the exercise used is excessive, and more harmful than beneficial: it has often to be discouraged; yet is there no perfect health without a due proportion of this ingredient. Perhaps where it is mingled with sports it is most salutary.

By those, who have leisure, cricket, the chase, shooting, and the higher branches of angling, are capable of being used to contribute, not to amusement only, but to health of body and mind. These sports have their seasons, a circumstance in itself most advantageous. Part of the year spent in graver occupation with lesser exercise;—another in which active bodily exertion is united with a mind unbent, present the wholesomest alternation.

Of the two common forms of exercise, walking is best adapted to the strongest; riding to the more delicate. The alternation of the two is best. Exercise on horseback is peculiarly fitted for women, who else hardly learn what is meant by exercise. The glow of health, and brilliancy of complexion, which a gallop* produces, nothing else imparts to a lady's cheek.

The revival of archery, and its introduction as a fashionable amusement, are in every way commendable. The following is the indignant reclamation of Latimer against its disuse in his time, when, indeed, historic recollections gave it an importance it were vain to attach to it now. Like the Grecian foot-race, British archery has fallen to the humble rank of wholesome exercise. "Men of England in times past," observes the Bishop, "when they would exercise themselves, (for we must needs have some recreation,) were wont to go abroad in the fields for shooting. The art of shooting hath been, in times past, much esteemed in this realm: it is a gift of God that he hath given us to excel all nations withal; it hath been God's instrument, whereby he hath given us many victories against our enemies. I desire you, my lords, even as you love the honour and glory of God, and intend to remove his indignation, let there be sent forth some sharp proclamation to the justices of peace, for they do not their duty. Charge them, upon their allegiance, that this singular benefit of God be practised, and that it be not turned into bowling, glossing, and dicing within the towns; for they be negligent in executing these laws of shooting. In my time, my poor father was diligent to teach me to shoot, as to learn me any other thing, and so I think other men did their children. He taught me how to draw, how to lay my body in my bow, and not to draw with strength of arms, as other nations do, but with strength of the body. I had my bows bought me, according to my age and strength; as I increased in these, so my bows were made bigger and bigger; for men shall never shoot well, except they be brought up to it. It is a godly art, a wholesome kind of exercise, and much commended in physic*."

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* I have looked in vain for the etymology of the word gallop, and conjecture it to be ἀέλλοπος, the Homeric epithet of Iris.

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* Fruitful Sermons preached by the Right Reverend Father, and constant Martyr, Master Hugh Latimer. London, 1596, p. 69.

Exercise of the Aged.

Habits of bodily exercise should be carried as far as possible into old age. The circulation is becoming more languid, the hands and feet are generally cold, and a growing torpor spreads over the system. Walking is then the best exercise; it is safer than riding, and warms the feet more. Being driven, in a carriage not too easy, is appropriate exercise for the aged, the feet being protected from the cold. In this exercise the body is passive, but not the less benefited by it. It is the same with friction, whether applied by the hand, or flannel, or a rough towel, or a flesh-brush. Friction produces a glow upon the skin, and gives local briskness to the circulation, and warmth. Age may be called a general palsy; and nothing serves so well to restore vigour after partial palsy as friction.

Of the different modes of applying friction, that by the hand is best, for it extends below the surface. Anything rough cannot be used with much pressure, or it will irritate and inflame the skin. Whereas the palm of the hand, which is smooth and soft, may be safely rubbed upon the limbs with a force which penetrates and gives motion to the muscles and internal parts, and excites the circulation in them.

Perhaps the application of oils to the skin in health has been too much neglected. It is probable that this practice, conjoined with friction, might give suppleness and warmth to the joints and limbs of the aged.

In Captain Barclay's feat of pedestrianism, already referred to, the greatest suffering which he experienced, was from pain in the calves of his legs. This Mr. Jackson tells me would probably have compelled him to relinquish his task, if he had not been advised (by him) to have his legs rubbed with a strong camphorated oil.

Dr. Rush remarks, "Old men tread upon the whole base of their feet at once in walking, and therefore wear out fewer shoes." The strain upon the ancles, which, with their knees, are weak, is thus avoided, and the step is more secure. The same author observes that "old men resemble children in being soon fatigued by walking, or exercise, and in being as soon refreshed by rest." Of exercise he remarks, "Gentle exercise is of great consequence in promoting the health of old people. It should be moderate, regular, and always in fair weather."

He adds, "I have not found sedentary employments to prevent long life, when they are not accompanied by intemperance in eating and drinking. This observation is not confined to literary men, nor to women only, in whom longevity without much exercise of body has been frequently observed. I met with one instance of a weaver; a second of a silversmith; and a third of a shoemaker, among the number of old people whose histories have suggested these observations."

Dr. Rush observes in another place, "The appetite is often good in old age. Parr, who died at 152, ate heartily in the last week of his life. The kindness of Nature in providing this last portion of earthly enjoyments for old people, deserves to be noticed. It is remarkable that they have, like children, a frequent recurrence of appetite, and sustain with great uneasiness the intervals of regular meals. But old people differ from children in preferring solid to liquid aliment." At Chelsea Hospital, Dr. Somerville has judiciously encouraged the pensioners, among whom are many in extreme age, to gain an additional repast by reserving part of their dinners for an evening meal; the two meals so obtained being, of course, at the same time light*.

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* This paragraph should have been introduced in a preceding chapter, but was inadvertently omitted.

CHAPTER III.

OF SLEEP.

In the admirable series of illustrations, by which a great philosophic genius, extending the argument of Paley, has deduced evidence of design in the universe from the reciprocal suitableness of the laws by which unconnected classes of natural phenomena are regulated, the adaptation of the length of the day to the constitution of man and animals and plants has not passed without notice.

Mr. Whewell observes, in reference to sleep, "Man in all nations and ages has taken his principal rest once in twenty-four hours, and the regularity of this practice seems most suitable to his health, though the duration of the time allotted to repose is extremely different in different cases. So far as we can judge, this period is of a length beneficial to the human frame independently of the effect of external agents. In the voyages recently made into high northern latitudes, when the sun did not rise for three months, the crews of the ship were made to adhere with the utmost punctuality to the habit of retiring to rest at nine, and rising a quarter before six; and they enjoyed, under circumstances apparently the most trying, a state of salubrity quite remarkable. This shows that, according to the common constitution of such men, the cycle of twenty-four hours is very commodious, though not imposed upon them by external circumcumstances." "No one can maintain, with any plausibility, that the period may be lengthened or shortened without limit. We may be tolerably certain that a constantly recurring period of forty-eight hours would be too long for one day of employment and one period of sleep with our present faculties; and all, whose minds and bodies are tolerably active, will probably agree that, independently of habit, a perpetual alternation of eight hours up, and four in bed, would employ the human powers less advantageously than alternations of sixteen and eight."

"The succession of exertion and repose in the muscular system, of excited and dormant sensibility in the nervous, appears to be fundamentally connected with the muscular and nervous powers, whatever the nature of these may be. The necessity of these alternations is one of the measures of the intensity of those vital energies; and it would seem that we cannot, without assuming the human powers to be altered, suppose the intervals of tranquillity which they require to be much changed*."

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* "The arbitrary quantity, the length of the physiological and of the astronomical fact, is the same. *Can this have occurred otherwise than by an intentional adjustment?*"—Whewell's Bridgewater Treatise, p. 37.

That sleep, the natural period of the alternation of which with a period of exertion, independent of, yet so curiously adjusted to the length of a diurnal revolution, Mr. Whewell has shown to be an additional proof of the existence of God, is felt by every one to prove His benevolence,—whether in the soothing influence, with which it steals over us, lapping the senses and tired thoughts in forgetfulness, or in the renovation, and alacrity of spirit, with which we rise refreshed from it.

Repose is not less necessary to the animal frame than exercise. The latter uses, the former restores. It is on their alternation and right balance that strength depends. We can give repose to a strained or weary limb by laying it horizontally and without motion, to an aching joint by a posture of ease and stillness, to the stomach by abstinence,—but not by means exactly parallel to these, can we give rest to the mind. It is in vain that in complete bodily tranquillity, we strive to give composure and quiet to our waking thoughts, their play continues to excite, and disturb, and exhaust; —for mental rest, more is wanted,—for the repose of the nervous system, there must be Sleep.

What is the condition of the mind during sleep?

The first question which presents itself, on entering into this inquiry, is, whether the current of ideas is ever entirely suspended: whether that endless flow of changing thought, which characterizes our waking hours, is even in the deepest sleep stagnant and motionless. There are strong reasons for believing that such complete intermission of mental action does not take place.

We breathe, and the action is probably voluntary, the call of a sensation, which we so relieve.

We compute the flight of time during sleep, and if we have business to transact that much interests our thoughts, wake at an unusual hour, before the required hour of waking, and out of the seemingly deepest repose. It is not, however, unlikely, that in this instance, where some kind of conscious observation must have been watching, our sleep has really been imperfect. Opposite as are waking and deep sleep, no two phenomena are more wonderfully chained together by links of insensible transition.

Many have thought that dreams belong to this intermediate state. Lord Brougham, who has given the most definite shape to this hypothesis, observes, after enumerating instances of lengthy dreams, the whole of which, however, must have been comprised in an infinitely short space of time, as they originated in the impression that awoke the dreamer, "There seems every reason to conclude that we only dream during the instant of transition into and out of sleep." I hardly think the facts warrant this conclusion, but am disposed to believe that many (if not all), in their sleep, always dream; and I think that the phenomena of dreaming furnish the best elucidation of the state of the mind during perfect sleep, going far to explain the essential nature of that repose which sleep is intended to give us.

In dreams, the facts which principally strike us are their monstrous and capricious combinations, and our want of surprise at their improbability. Thought suggests thought perfectly at random; the laws of mental crystallization seem suspended or confounded; any side of any element of thought appears capable of attracting the unlikeliest relation of another. Yet we seem to see nothing extraordinary in the fantastic creations.

Two checks are wanting in dreaming, which in our waking hours, restrain the wildness of fancy.

The first of these is the exclusion of sensation. In our waking hours our senses keep before us the cold reality of life; the imagination may range, but the present sensible world arrests its flight even in the most absorbing reverie, unless the action supposed bears a true analogy to human existence.

The second check constantly present during our waking hours is this: we recollect our relation to every event and person presented to our senses or to our thoughts. Something like our true position is constantly before us. In dreams this is quite forgotten,—wife, children, home, are not ours;

while the friends whom we have lost, our parents, long wept in the grave, meet and converse with us, as if they were our daily companions.

The last is the essential mental character of sleep: our fancy experiences no check from reality, for the link which unites its operations with past and with present and with future existence, is temporarily unloosed.

In sleep the mind is put *out of gear.* The engine may continue to work, but the whirl of thought bears no relation to our practical being. It does not use our recollections of the past, or touch or influence our present purposes. Our personal being is detached from the play of our associations: our anxious and responsible nature, with all its thoughts and cares, is wrapt in oblivion. Imagination, so dimly lighted is the chamber in which Reason sleeps, looks upon our tired hopes, our anxious fears and wants, and does not recognise them.

Captain Franklin remarks, when his party was in the extremity of physical exhaustion and physical suffering,—" The sensation of hunger was no longer felt by any of us;—yet we were scarcely able to converse on any other subject than the pleasure of eating*." *But their dreams at this*

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* What that severity of suffering was, the following example will bring to the reader's memory.

" In the evening, there being no *tripe de roche,* we were compelled to satisfy, or rather to allay, our cravings of hunger by eating a gun-cover, and a pair of old shoes."

period, while they were starving, were of plentiful repasts.

It may be difficult to go deeper than the observation of the fact and its final cause. Its purpose is rest. This Nature effects in sleep, by unloosing our mental powers from our recollections: the former may move rapidly, or be quiescent,—it matters not: the resistance is removed,—the engine whirls on without strain or effort,—the machinery of our being is detached from it. It would be pursuing the analogy too far, to conjecture that this fact explains the rapidity of thought in dreams.

It has been mentioned that there is every shade between waking and deep sleep: accordingly there are cases of sleep, in which the preceding rule is partially deviated from. The somnambulist is guided by sensation, and sometimes has a general recollection of his identity and position, and answers pertinently even about himself. Still his mind is half occupied by fiction: and the object of sleep, repose, is in a great measure forfeited. The following account, which I borrow from Dr. Abercrombie's *Treatise on the Intellectual Powers*, is perhaps most interesting from the difficulty which it exemplifies, of the somnambulist mentally recognising himself.

"The subject of this account was a zealous botanist, and had lately received the highest botanical prize from a public institution. One night, about an hour after he had gone to bed, after his return from a long botanical excursion, his master, who was sitting in a room below, heard a person coming down stairs with a heavy measured step, and, on going into the passage, found his pupil, with nothing on him but his hat and his shirt, his tin case swung across his shoulders, and a large stick in his hand. 'His eyes,' says my informer, 'were more open than natural, but I observed he never directed them to me, or to the candle which I held. While I was contemplating the best method of getting him to bed again, he commenced the following dialogue: "Are you going to Greenwich, Sir?" "Yes, Sir." "Going by water, Sir?" "Yes, Sir." "May I go with you, Sir?" "Yes, Sir; but I am going directly, therefore please to follow me." Upon this I walked up to his room, and he followed me without the least error in stepping up the stairs. At the side of his bed, I begged he would get into the boat, as I must be off immediately. I then removed the tin case from his shoulders, his hat dropped off, and he got into bed, observing he knew my face very well,—he had often seen me at the river-side. A long conversation then ensued between him and the supposed boatman, in which he understood all that was said to him, and answered quite correctly respecting botanical excursions to Greenwich made by the professor of botany and his pupils; and named a rare plant he had lately found, of which the superintendent of the botanic garden had seen only one specimen in his life, and the professor only two. After some further conversation, he was asked whether he knew who had gained the highest botanical prize, when he named a gentleman, but did not name himself. 'Indeed!' was the reply; 'did he gain the highest prize?' To this he made no answer. He was then asked, 'do you know a Mr. ———,' naming himself; after much hesitation, he replied, 'if I must confess it, my name is ———.' This conversation lasted three quarters of an hour, during which time he never made an irrelevant answer, and never hesitated, except about the prize and his own name, He then lay down in bed, saying he felt tired, and would lie upon the grass till the professor came. But he soon sat up again, and held a long conversation with another gentleman who then came into the room, when he again understood everything that was said to him, and answered readily and correctly, sometimes uttering long sentences without the least hesitation. After a conversation of about an hour, he said, 'it is very cold on this grass, but I am so tired, I must lie down.' He soon after lay down, and remained quiet the rest of the night. Next morning he had not the least recollection of what had passed, and was not even aware of having dreamt of anything."

In concluding this inquiry as to the condition of the mind during sleep, I will lay before the reader the most remarkable instance, of which any account has come before me, of what has sometimes been termed *double consciousness;* I believe it to exemplify sudden transitions to and from the state of somnambulism.

The subject of it is a young lady, and the following are Dr. G. Barlow's words, who communicated the case to me.

"This young lady has, in fact, two distinct states of existence. During the time that the fit is on her, which lasts sometimes for a few hours, sometimes for three days, she is occasionally wild, merry, and mischievous; occasionally appears in pain, and rolls about in uneasiness; but in general seems so much herself, that a stranger coming into the room would not remark anything extraordinary. She amuses herself with reading or working, plays on the piano *better than at other times*, knows everybody, remembers everything, and converses rationally, and makes very acute observations upon what she has seen, heard, or read. The fit leaves her suddenly, and she then forgets everything that has passed during it, and imagines that she has been asleep, and sometimes that she has dreamt of any circumstance that has made a vivid impression: *e. g.* During the period of these fits she had been reading some of Miss Edgeworth's tales, and had in the morning been reading one to her mother, she went for a few minutes to the window and suddenly exclaimed, "Mamma! I am quite well, my headach is quite gone," returned to the table, and taking up the open volume which she had been reading five minutes before, said, "What book is this?" turned over the leaves, looked at the frontispiece, and replaced it upon the table. Seven or eight hours after, when the fit returned, she asked for the book, went on at the very paragraph where she had left off, and remembered every circumstance of the narrative; and so it is always, as she reads one set of books during one state, and another during the other. She would seem to be pretty conscious of her state, for she said one day, "Mamma! this is a novel, but I may safely read it; it will not hurt my morals, for when I am well I shall not remember a word of it."

Condition of the Brain during Sleep.—No physiological inquiry is more pregnant than this.

A case is related by Blumenbach, of a person who had been trepanned, and whose brain was observed *to sink when he was asleep*, and swell out when he was awake,—*a proof that the cerebral circulation is more languid when we sleep than when we are awake.* The brain is not moved and excited by the same eddy and tumult of the blood during sleep as during the hours of waking. Accordingly, all the circumstances which hurry the circulation, such as mental contention, thought, joy, anxiety, bodily exertion, excite the heart's action, and are antidotes to sleep.

It is not equally easy to prove, but on reflection it appears no less certain, that *the nervous power of the brain is lowered in sleep;* that the depression of the cerebral circulation is accompanied by depression of cerebral energy. But how else are we to account for the slowness or suspension of digestion during sleep, the feebleness of the heart's action, the susceptibility of cold. "The steam has been turned off," and the body is relaxed; its functions (a fact best perhaps shown in hybernating animals,) are half at a stand-still; that which imparts force and activity to every function, is no longer generated in adequate power and quantity; the brain, the source of nervous energy, is in repose.

The bearing of these conclusions, if just, upon cerebral disease, is of supreme importance. *Brain attacks generally come on during the night, and during sleep.* That is to say, *they mostly supervene at the time when the power of the brain is lowered.* They are then, in some degree, connected with depression of the cerebral forces. They are favoured by weakness and exhaustion of the brain.

The attacks to which I refer are epilepsy, apoplexy, palsy; the common impression respecting which is, that they proceed from determination of blood to the brain, or from some kind of force or pressure operating actively to disturb the functions of the organ. I believe, on the contrary, that in the majority of cases, especially in advanced life, all these seizures result from cerebral failure, from weakness, depression of power, temporary or permanent, of some part or the whole of the brain.

It does not contravene the preceding conclusion, that these complaints are liable to be primarily induced by *action in the head*;—that where they do not result from alteration of structure, they often may be traced to habits of full living and strong excitement, which have frequently thrown the blood in hurried and violent circulation through the brain;—and that besides, in many instances, a loaded and laboured circulation goes with, and gives increased danger to such attacks;—and that nothing is more likely to benefit *the latter class of cases* than diminution by means of cupping, of the quantity of blood in the vessels. But grouping together all cerebral seizures that take the form of fits, I believe that the cases in which cerebral congestion is a feature, *are the exceptions*; and that it is most important the practice grounded on this principle should be recognised, that *diminishing the quantity of the blood is not the appropriate remedy for cerebral seizures.* The majority of such cases proceed from sudden failure of the powers of the brain; and lowering the circulation will but additionally depress, (while, by a curious law too long to enter into here, but which the reader may find explained in my outlines of pathology,) diminution of the mass of circulating fluid is attended necessarily with arterial excitement in the brain.

The mildest form of epilepsy is best described by the term *leipothymia**, desertion of mind. It consists in sudden failure of consciousness frequently unattended with giddiness, often so transient, that the patient does not fall, but recovers in time to save himself. When such slight attacks occur in the night, the patient, before sleeping tranquilly, starts up abruptly, awakened by the consciousness that he is rallying from such a sudden oblivion. These attacks are attended often with a feeble or failing pulse, sudden perspiration, every sign of physical and nervous weakness; they are cerebral debility, and at the moment stimulants should be used, to rouse the languid brain and heart.

Repose of mind, gentle exercise, free air, a regulated diet, medicine when necessary, are the means wanted to recruit the system, and strengthen the brain. A gentleman, whom I have attended, with a pulse then below thirty, had a strong epileptic fit; the pulse fell to twenty-seven; his pale countenance looked pinched, as if fainting were supervening upon the other unconsciousness. Brandy, with hot water was given him from time to time, and he gradually recovered sensibility. Two or three times life was ebbing, but for the cordial.

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* Leipothymia, *λειπεὶν*, to leave, *θυμος*, the mind.

In apoplectic seizures* of the aged, I have distinctly observed in the weakened and intermitting pulse, and pale countenance, evidence that the symptoms have arisen from failure of the cerebral powers, and have seen the best effects arise from not lowering, but from supporting the failing strength.

In palsy, or sudden partial loss of power, with or without loss of feeling, the same principle is still more easily established. Palsy has even occasionally supervened during the act of bleeding for the relief of head-symptoms.

A gentleman,—distinguished not less in his walk of literature, than by his early successful career abroad, and at home by the discharge of an important office in the most brilliant days of our naval history, than by his public disinterestedness and munificence,—when already in great age, I happened to see during an apoplectic seizure, and a year subsequently, in one of palsy. In the first attack he had not been bled, and he had gradually recovered. In the second (his pulse being weak, irregular, unequal) he slept almost constantly; but each evening his face was slightly heated and flushed. This led to the application of six leeches to his temple; the pulse became, through so small an abstraction of blood, thready, and the hands and feet cold, rendering a cordial immediately necessary. With nutritious diet, which formed almost the whole of the subsequent treatment, this gentleman recovered from the palsy; and though feeble, and then declining in the vale of years, and the powers of his mind touched by decay, he yet numbered afterwards many serene and cheerful hours. His death, which took place two years after the attack of palsy, told the same tale with his previous illnesses. Having been unusually well for two days, and having displayed more than usual strength and spirits, early in the morning he was heard to move, and utter inarticulately, and was dead. He died of sudden cerebral failure.

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* Apoplexy is a more or less sudden and permanent oppression of the mental functions, varying in degree in its mental features, from confusion of thought to complete stupor.

I trust that the importance of the principle which I have endeavoured to establish, and the closeness of its connexion with sleep, will appear a sufficient apology for the extent of medical illustration into which I have been led.

Influences which promote or prevent Sleep.— The best preparation for sleep is sixteen hours of varied mental and bodily occupation, enough to tire, not to exhaust; the mind not having been over-excited, the body not over-fatigued, and the spirits at the close equable, or if out of moderation, rather depressed than exhilarated.

It is recorded of Napoleon, and reported of another of the same order and caste of genius, that he could at any time compose himself to sleep at will. The fact seems wonderful, but, if true, it is no wonder. The mind and body, in such a case, constantly used to the utmost, would constantly be in need of repose. If we imagine in such a case, a consciousness of talent equal to any emergency, combined with perfect physical and moral courage, and a clear view of all the contingencies of the hour, the question is not what should enable, but what is to prevent a hero dropping asleep at the first convenient opportunity.

The mind has more to do with the prevention of sleep than the body. Different persons, however, take different views of what is mentally composing. Dr. Macnish observes, "a person would more readily fall asleep listening to a profound piece of argumentation, than to a humorous and fanciful story; and probably more have slumbered over the pages of Bacon and Locke than over those of Shakspeare and Milton." I confess that I feel disposed to reverse the terms of the antithesis, being in the habit of taking refuge in a poem, or a novel, from the state of full mental waking which I find reflection produce.

Dugald Stewart remarks, "It is well known that there is a particular class of sounds which compose to sleep. The hum of bees, the murmur of a fountain, the reading of an uninteresting discourse, have this tendency in a remarkable degree. If we examine this class of sounds, we shall find that it consists wholly of such as are fitted to withdraw the attention of the mind from our own thoughts, and are at the same time not sufficiently interesting to engage its attention to themselves."

The real effects, which have been produced by animal magnetism turn upon the same principle, —they are produced by the iteration of trifling impressions. A gentleman, not in the medical profession, with whom I am intimately acquainted, assures me that he has several times succeeded in putting children to sleep by going through the magnetizing process; and if I did not know the fact through his statement, I should believe, from the probability of the case, that the effect would generally follow.

Heat produces opposite effects in respect to sleep; it disposes us to sleep in the day-time, but interrupts sleep at night. In the day-time it oppresses, relaxes, weakens*; at night it stimulates. In hot weather the entire quantity of sleep taken is less than in cold weather. On a change of weather in winter one is often kept awake, till he remembers that the clothes on his bed are too warm for the thaw which has succeeded.

Cold promotes sleep. In the winter we sleep more than in summer. This arises from two causes; our habits are of more active exertion in winter, which exhausts; and the cold itself, by requiring a larger supply of heat from us, likewise consumes our strength, not to mention the disinclination to leave the pleasant repose of our beds, during which sleep again overtakes us.

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* "A heated church, and a dull sermon, are almost sure to produce sleep."—*Philosophy of Sleep.* By Robert Macnish.

Nature, if I may be allowed the expression, has stepped out of her path to give this element of animal nature, namely, the relation of sleep to cold, developement. Many animals hybernate, or fall into a winter-sleep, during which they take no nutriment, but remain torpid, their breathing and circulation being extremely languid, and their nourishment turning upon the absorption of their summer fat. In these animals the temperature falls during hybernation, to obviate the effect of which they ensconce themselves under shelter, and many of them accumulate materials around them to exclude the cold. It is singular that exposure to intense cold wakens a hybernating animal. Cold, as a mortal agent, destroys by producing "sleep that knows no waking." The hybernating animal wakened by cold sinks under its influence into a new sleep, and dies.

In Captain Cook's first voyage, the effects of cold inducing this sleep are strikingly instanced. The scene occurred in the island of Terra-del-Fuego. Dr. Solander, Mr. Banks, and several other gentlemen, had ascended the mountains of that cold region for the purpose of botanizing and exploring the country. "Dr. Solander, who had more than once crossed the mountains which divide Sweden from Norway, well knew that extreme cold, especially when joined with fatigue, produces a torpor and sleepiness that are almost irresistible. He, therefore, conjured the company to keep moving, whatever pain it might cost them, and whatever relief they might be promised by an inclination to rest. 'Whoever sits down,' said he, 'will sleep; and whoever sleeps, will wake no more.' Thus at once admonished and alarmed, they set forward; but while they were still upon the naked rock, and before they had got among the bushes, the cold became suddenly so intense, as to produce the effects that had been most dreaded. Dr. Solander himself was the first who felt the inclination, against which he had warned others, irresistible; and insisted upon being suffered to lie down. Mr. Banks entreated and remonstrated in vain; down he lay upon the ground, although it was covered with snow, and it was with great difficulty that his friend kept him from sleeping. Richmond, also, one of the black servants, began to linger, having suffered from the cold in the same manner as the doctor. Mr. Banks, therefore, sent five of the company, among whom was Mr. Buchan, forward, to get a fire ready at the first convenient place they could find; and himself, with four others, remained with the doctor and Richmond, whom, partly by persuasion and entreaty, and partly by force, they brought on; but when they had got through the greatest part of the birch and swamp, they both declared they could go no further. Mr. Banks again had recourse to entreaty and expostulation, but they produced no effect. When Richmond was told that if he did not go on he would in a short time be frozen to death, he answered that he desired nothing but to lie down and die. The doctor did not so explicitly renounce his life; he said that he was willing to go on, but that he must first take some sleep, though he had before told the company to sleep was to perish. Mr. Banks and the rest found it impossible to carry them; and there being no remedy, they were both suffered to sit down, being partly supported by the bushes; and in a few minutes they fell into a profound sleep. Soon after, some of the people who had been sent forward returned, with the welcome news that a fire was kindled about a quarter of a mile further on the way. Mr. Banks then endeavoured to awake Dr. Solander, and happily succeeded. But though he had not slept five minutes, he had almost lost the use of his limbs, and the muscles were so shrunk, that the shoes fell from his feet: he consented to go forward with such assistance as could be given him, but no attempts to relieve poor Richmond were successful."

The following remarks by Dr. Macnish, in relation to this subject, are extremely interesting. The practical rule is excellent, and the fact explains how animals may hybernate in snow.

"If a person is unfortunate enough to be overtaken in a snow-storm, and has no immediate prospect of extrication, he should, if the cold is very great, and the snow deep, sink his body as much as possible in the latter, leaving only room for respiration. By this plan, the heat of the body is much better preserved than when exposed to the influence of the atmosphere, and life has a greater chance of being saved; for the temperature of the snow is not lower than that of the surrounding air, while its power of absorbing caloric is much less. It is on this principle that sheep live for such a length of time enveloped in snow-wreaths, while, had they been openly exposed, for a much less period, to a similar degree of cold, death would inevitably have ensued."

Dr. Darwin mentions that a person placed upon a mill-stone, revolving rapidly, is thrown into sleep. I cannot find the facts upon which this statement is grounded. But I conclude that pressure upon the brain, and stupor, would be the natural physical and physiological consequences of such an experiment. Dr. Macnish observes, "By lying flat upon a mill-stone while performing its revolutions, sleep is soon produced, and death without pain would be the result, if the experiment were greatly protracted." Sir John Sinclair says, "The celebrated engineer, Brindley, often saw the experiment tried, of a man extending himself across the large stone of a corn-mill, and gradually falling asleep by the stone whirling round, before the stone had gained its full velocity."

A heavy meal produces somnolency. The effect probably ensues from the temporary exhaustion of the brain, caused by the determination of the blood and nervous energy to the stomach. The sleep, which follows, is heavy and disturbed. It should not be indulged in. It carries no refreshment with it. The labouring digestion requires the stimulus of waking to help it. A heavy meal should therefore never be taken late at night;—*then*, in addition to the reasons against it, which have been stated, the system is already exhausted by the day it has toiled through. A good meal at night, however, may be taken with another view. Suppose you have to watch, and not to sleep: it is certain that food is, to a certain extent, a substitute for sleep, and in that case, may be used as such. This means, however, can be resorted to by those only whose digestion is strong. I have already described (page 60,) the extraordinary quantity of food which Captain Barclay consumed in his match of one thousand miles in a thousand hours. It was the strength of his stomach (after his courage and endurance) which carried him through that match. The food he chymified was a substitute for sleep.

It has been remarked that those who eat heartily, and have strong digestive powers, usually sleep much. Those who do so, try their constitutions severely, and fall into dangerous plethora. The habit becomes gross and overloaded, and in danger of a troop of illnesses. One mode of relief is occasionally present in such cases in the shape of profuse perspiration. But this, as it is highly relaxing, lowers the tone of the system, and weakens the person who so indulges in body and in mind.

Preparation for Sleep.—A sleeping-apartment should be well ventilated: it is therefore desirable in winter to have a fire in a bed-room, or in a dressing-room opening into it. The bed had better stand detached from the wall for the same purpose. The curtains should not be drawn close; the quantity of covering should be regulated by the temperature of the weather. Dr. Rush observes, "Warm bedclothes are especially proper to preserve or increase the heat of old people. From the neglect of this observance, they are often found dead in their beds in the morning, after a cold night, in all cold countries. The late Dr. Chovet, of New York, who lived to be eighty-five, slept in a baize nightgown, under eight blankets and a coverlet, in a stove-room, many years before he died."

It is best to sleep in a linen or cotton night-dress, which should be loose at the wrist and neck. Half the physical refreshment of sleep depends upon the laying aside the weight and constriction of ordinary dress.

It is best to sleep on a mattress,—but in this, as in everything else, change is preferable: in winter a feather-bed not too soft, in summer a hair mattress, may be used.

The shutters should be closed, in winter for warmth, in summer to save the eyes from the morning light.

The means that we use to induce sleep are founded upon principles which have been already explained.

We close the avenues of sensation*, as far as we are able; we dispose our bodies in a posture of complete relaxation, and ease, and passive support, and endeavour to divert our minds from all subjects that excite activity of thought or disturbance of feeling. We strive to forget ourselves, by detaching our minds from thought, and endeavouring to be lost in the sensation of physical rest.

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* *During* sleep, the exclusion of impressions is carried still further. The pupil is instinctively diminished to a most minute aperture. This fact, which I do not think had been before observed, I learnt when living as house-surgeon in the Middlesex Hospital, in 1818. A mother brought an infant for advice, which had fallen out of window a short time previously: its breathing was gentle, and it seemed to have nothing the matter with it, but the eyes were half open, and the pupils were highly contracted. In those days, contraction of the pupil was supposed to be a sign of concussion of the brain; and upon my noticing to some one standing by, this circumstance in the infant, the mother told me, that when asleep its eyes were always so. Upon examining the state of the pupil in sleep in several instances, which my situation gave me the opportunity of doing, I found that contraction of the pupil is universal in sleep.

When sleep shuns us, and the mind falls into exciting trains of thought, the best plan is to rise, and read for a short time some work of a light and amusing character, that has no connected argument or story to engage the mind.

The following rules relate to the posture to be maintained in sleep. They are from the Chinese. In substance they are excellent.

"As soon as you are in bed, you should lull the heart to sleep; I mean you should compose it, and cast aside every thought which may banish sleep. Lie upon either side, bend your knees a little, and sleep in that posture; which will prevent the dissipation of the vital and animal spirits, and keep the heart in good case. Every time you awake, stretch yourself in bed. This will render the course of the spirits, and the circulation of the blood, more free. 'Sleep not in the posture of a dead man,' says Confucius; that is, lie not on your back. Let not your hands rest upon your breast or heart, and then you will have no frightful dreams, or fancy that some *yen*, or evil spirit, oppresses you, and holds you, as it were, benumbed, so that you cannot help yourself by shaking or changing posture*."

When our sleep is disturbed, either from indigestion, or uneasy thoughts, or uneasy bodily posture, a variety of impressions or sensations occur, to which we experience nothing parallel when awake.

The most agreeable of these sensations, is that of flying; it is unattended with any idea of exertion, but consists in a sense of easy motion, in which we seem to glide, supported upon the air.

Another sensation, which is much more common, is that of tumbling over and over; it has some analogy to the preceding; there is the same idea of want of support present, but instead of floating in the empyrean, we appear to fall headlong perpendicular, and awake startled with the impression.

Nightmare is a sense of oppression at the chest, felt during sleep, arising either from indigestion or from our posture. It is always attended with a vague sense of terror, and of inability of exertion. Any kind of frightful dream may go with it. The extremity of suffering wakes us; and there is generally a brief but appreciable interval, between the imperfect recovery of our recollection of where we are, and the cessation of the seeming powerlessness. Immediately after being awake, we exert volition, move, and the uneasiness is at an end.

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* Chan Seng.

A frightful dream alone is not nightmare. But becomes so when joined with an ideal effort at exertion, and a persuasion that it is impossible to make it. A simply frightful dream wakes when the agony of terror becomes intense.

Quantity of Sleep.—The quantity of sleep required by grown-up people ranges between four and nine hours. This has partly to do with peculiarity of constitution. With some the mind and body work quietly and without irritability; others, going through the same round of business and amusement, are more exhausted: the latter require longer sleep. But use has much to do with this, as with other functions; and many suppose a much longer period of repose necessary to them, than their health actually requires.

Too much sleep is relaxing. The best rule, for those who are in health and sleep well, is to rise after their first sleep,—when one feels refreshed, and can rise at once with alacrity. Upon indulging in a second sleep, a free perspiration often ensues, and one wakes relaxed, and heavy from sleep, and exhausted.

Women require more sleep than men; those of the nervous and sanguine temperaments, more than the phlegmatic and the bilious. The necessary quantity of sleep for adults varies from four to nine hours; from seven to eight is the want of the majority*. Persons under training sleep from eight to ten hours.

Those who sleep nine or ten hours from indolence, probably sleep less concentratedly, and have not the same intensity of repose, which those have, who, sleeping only when it is necessary, drop sound asleep at once.

Infants, for the first month, pass almost their whole time in sleep; or they alternately take nourishment and repose. The quantity of nourishment necessary for their growth fatigues them, and they sleep to recruit their digestive powers. It is the same with those who are recovering from exhausting illness. They often require the same quantity of sleep, the same light and frequent meals. Till the age of three years, children require sleep during the day, and pass half of their time in sleep. The period of sleep is then to be gradually reduced; a child at seven should not sleep more than nine hours. With weakly children, it is important to bear in mind the exhausting character of more prolonged, or, as it really is, renewed sleep. They should rise early; and if more sleep is necessary for their strength, they may lie down and take repose for a short period during the day.

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* General Elliott, who was extremely abstinent, living upon bread and rice and water, never slept more than four hours out of the twenty-four. Frederick the Second, and John Hunter, slept five.

Children should never be wakened suddenly; their nervous system, tremblingly sensitive, is liable to receive injury from the lightest causes. Great care should be taken to exclude from, or to prevent arising in, the minds of children, those superstitious fears, and that terror of the dark, which they are so disposed to fall into.

When age begins, the quantity of sound sleep lessens. In extreme age the tendency to longer sleep returns, and part of the day is passed in somnolency, the more necessary, that the rest at night is frequently broken.

The celebrated De Moivre slept twenty hours out of the twenty-four, and Thomas Parr latterly slept away by far the greater part of his existence.

Dr. Rush observes of the wakefulness of old people,—" Such is the excitability of the system in the first stages of old age, that there is no pain so light, no anxiety so trifling, and no sound so small, as not to produce wakefulness in old people. It is owing to their imperfect sleep that they are sometimes as unconscious of the moment of their passing from a sleeping to a waking state, as young and middle-aged people are of the moment in which they pass from a waking to a sleeping state. Hence we so often hear them complain of passing sleepless nights. This, no doubt, frequently is the case; but I am satisfied, from the result of an inquiry made upon this subject, that they often sleep without knowing it, and that their complaints in the morning, of the want of sleep, arise from ignorance, without the least intention to deceive."

Dreaming is universal among old people. It probably has to do with their imperfect sleep.

Period for Sleep.—It is unnecessary seriously to argue that the night is the proper time for repose in temperate climates, for no one will deny that we must exist alternately in waking and sleeping, or will doubt that day is the proper time for the former. Our eyes are formed to use by day; Nature, in her brilliancy of colouring, can be seen then only; and the direct action upon the skin, of the light and heat of the sun, is necessary to perfect health. But we have still a choice to make. For in the winter there is more darkness, in the summer less, than the necessary period of repose demands. Are we to borrow hours of waking from the evening or the morning of the long winter's night? The common sense of the world has decided that the latter is preferable.

Those who are engaged in business are, through this habit, beforehand with the day: nothing need then be hurried; the offices of the day may be well thought over, and every necessary arrangement planned. Nor is there any better time, if one has superfluous leisure, for literary pursuits, than the early morning hours. It is indeed too much the custom, and sometimes hardly avoid-able, to throw one's studies late into the night, when there is no interruption, and there happens to be spare time. This practice, however, forms a most injurious combination with a life of business, as it destroys sleep, that is so needed. The mind, instead of wholesomely tiring towards eleven, is wakened up, stimulated afresh by its own exertions, and hour after hour glides by; and when at length one's couch is sought, the busy thoughts cannot detach themselves from our pursuits, our mind cannot be put *out of gear.* One whose time is his own, may, if he pleases it, convert night into day, day into night; and if during some part of the day he takes wholesome exercise in the open air, and his diet is moderate, one cannot say that his health will necessarily suffer by this substitution of an artificial for the natural period: but the probability is that the habits of life, which would co-exist with such indulgence, would be irregular, and that therefore it would be indirectly more injurious. One who combines with late hours of study, habits of active business in the day, will certainly, whatever his original strength, find both his health and mental powers early impaired.

The period of the twenty-four hours, to one who has been watching, when repose is most imperiously called for, (*suadentque cadentia sidera somnum,*) is the early morning before daybreak, or from three to five. The same period is likewise the coldest in the night, or feels so, to the traveller on the mail, who can hardly resist the pressure on his wearied eyelids, and wakes perpetually, when his head nodding forward warns him of his danger.

In this climate, under common circumstances, there is no occasion for sleep during the day; when, however, great exertion and exhaustion render it necessary, it should not immediately follow a meal; such second sleep is best, perhaps, when taken one hour after dinner, or two, according as that repast has been more or less light. The sleep should likewise be short, and not exceed a quarter to half an hour. A short nap at this period is much more refreshing than a protracted one; it is a kind of Morphic luncheon, which should not be too heavy.

In tropical climates, in which the temperature of the middle of the day at the hottest season precludes exertion and disposes to sleep, the practice of sleeping after a light mid-day meal is at all events natural; but though tranquillity is then necessary, sleep is not so, and as a constant practice, the habit had better not be formed.

CHAPTER IV.

OF BATHING.

"IN the fable of restoring Pelias to youth again, Medea, when she feigned to do it, propounded this way of accomplishing the same; that the old man's body should be cut into small pieces, and then boiled in a caldron with other medicaments." Lord Bacon, whose words these are, adds, "There may, perhaps, some boiling be required to this matter, but the cutting to pieces is not needful."

Personal cleanliness is at once so conducive to health, so essential to social comfort, and so naturally allied to purity of mind, that it deserves to be called, if it has not already been, a physical virtue. The English are eminent for this virtue; the practice of which has been, of late years, and is still becoming, diffused through humbler and larger circles. A late amiable and excellent man, and useful member of society, and amusing humorist, seems, indeed, to have doubted its absolute necessity, and to have believed in the existence in the human body, not only of a capability of becoming soiled, but of an internal counteracting self-purifying principle. The means, by which Mr. Walker supposes that this principle may be brought into activity, is the observance of abstemiousness in diet, the cleansing effects of which in his own person are thus described by the author of "The Original."

"I felt a different being, light and vigorous, with all my senses sharpened. I enjoyed an almost glowing existence. I cannot help mentioning two or three instances in proof of my state, though, I dare say, they will appear almost ridiculous, but they are nevertheless true. It seems that from the surface of an animal in perfect health, there is an active exhalation going on which repels impurity; for when I walked on the dustiest roads, not only my feet, but my stockings, remained free from dust. *By way of experiment, I did not wash my face for a week, nor did any one see, nor I feel, the difference.*"

I have not heard, that Mr. Walker's spontaneous-cleanliness doctrine has made proselytes. If such there are, it may be important to suggest to them that this effort of Nature to keep them clean, shows what her wishes are; and that it behoves them, as *Naturæ ministros et interpretes*, to follow out and second her intentions, by using those common means which the incredulous find requisite for their own comfort and that of others. It may be safely presumed that the dirt-repelling principle is not weakened, but strengthened, by those external means which are calculated to remove from the skin all obstructing impurities.

The virtue and blessing of cleanliness is within the reach of all, whom fortune has raised above abject poverty. The elements are not costly;—a large basin and a foot-tub, soap, water, and towels, are all that is strictly essential.

The following are the rules for their use:—

At night, warm water should be employed; in the morning, cold.

Some are in the habit of using cold water at night;—this is a physiological error. The frame after the exhaustion of the day, is in a state to be the better for the soothing, relaxing, fomenting influence of warm water. The whole person should, preparatory to retiring to rest, be bathed with warm soap and water; and afterwards a moderate glow should be produced by gentle drying with towels. After a day of unusual fatigue, every one must remember the comfort he has derived from this process. Pleasurable bodily restoration, less in amount, no doubt, but the same in kind, follows the regular practice of warm ablutions. I have heard it alleged that cold water used at night has the advantage of preventing the feet from becoming tender. The reverse is the fact: tenderness of the feet, I know from experience, is much sooner and more surely remedied by the daily use of warm water than of cold. It is needless to remark that the direct purpose of bathing is better obtained by warm than by cold water.

The morning is the season for the employment of cold water; the temperature of which, however, should bear a relation to the time of year, and temperature of the weather, as well as to the strength of the person using it. Sometimes, therefore, it is better to use water in the morning tepid; just as at night it may happen, for various reasons, to be desirable to avoid the relaxing effects of water too warm. A person in health and strength is the better for having the entire person bathed with cold water in the morning, followed by sufficient friction to produce a general healthy glow.

In these simple directions, two effects are contemplated; one, niceness of the person,—the other, a stimulating or soothing influence on the nerves, or on the system generally. Both of these effects are capable of being attained to a still greater extent by the use of baths, which form the subject next to be considered.

There are many kinds of baths, and varieties of bathing; but they may be conveniently arranged in three classes;—the first, air and vapour baths; the second, warm and hot water baths; the third, cold and shower baths. Of these, the first alone deserves consideration as a means of personal cleanliness; the second and third are inferior aids for this purpose to simple soap and water. Water by itself, warm or cold, is either not cleansing, or very imperfectly so. Warm, and cold baths likewise, may be said in fact to be employed almost exclusively medicinally, or with a view to their general influence upon the system, not for ablution. And even the vapour-bath, complete and perfect as it is, as a means of purifying the surface, yet exerts so powerful an agency upon the system, as to be seriously injurious, when used as a habit of cleanliness, from its collateral influence upon the health.

The vapour-bath, where it is most used, combines the full effects of transpiration and complete opening of the pores with ample lavation afterwards. The following is Mr. Willis's lively account of the process, as it is practised in Turkey, where it has a completeness and luxury unknown elsewhere*.

"Went ashore at Castle Europe, with one or two of the officers, to take a bath. An old Turk, sitting upon his hams at the entrance, pointed to the low door at his side, without looking at us, and we descended by a step or two into a vaulted hall, with a large circular ottoman in the centre, and a very broad divan all round. Two tall young Mussulmen, clad in turbans and waistcloths only, assisted us to undress, and led us into a stone room, several degrees warmer than the first. We walked about here for a few minutes, and as we began to perspire, were taken into another, filled with hot vapour, and, for the first moment or two, almost intolerable. It was shaped like a dome, with twenty or thirty small windows at the top, several basins at the sides, into which hot water was pouring, and a raised stone platform in the centre, upon which we were all requested, by gestures, to lie upon our backs. The perspiration at this time was pouring from us like rain. I lay down with the others, and a Turk, a dark-skinned fine-looking fellow, drew on a mitten of rough grass-cloth, and laying one hand upon my breast to hold me steady, commenced rubbing me, without water, violently. The skin peeled off under the friction, and I thought he must have rubbed into the flesh repeatedly; nothing but curiosity to go through the regular operation of a Turkish bath prevented my crying out "enough!" He rubbed away, turning me from side to side, till the rough glove passed smoothly all over my body and limbs; and then, handing me a pair of wooden slippers, suffered me to rise. I walked about for a few minutes, looking with surprise at the rolls of skin he had taken off, and feeling almost transparent as the hot air blew upon me. In a few minutes my Mussulman beckoned me to follow him to a smaller room, where he seated me on a stone beside a font of hot water. He then made some thick soap-suds in a basin, and with a handful of fine flax, soaped and rubbed me all over again, and a few dashes of the hot water from a wooden saucer, completed the bath.

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* Willis's *Pencillings by the Way.*

"The next room, which had seemed so warm on our entrance, was now quite chilly. We remained here until we were dry, and then returned to the hall in which our clothes were left, where beds were prepared on the divans, and we were covered in warm cloths and left to our repose. The disposition to sleep was almost irresistible. We rose in a short time, and went to the coffee-house opposite, when a cup of strong coffee and a hookah smoked through a highly-ornamented glass, bubbling with water, refreshed us deliciously.

"I have had ever since a feeling of suppleness and lightness, which is like wings growing at my feet. It is certainly a very great luxury, though, unquestionably, most enervating as a habit."

An accomplished physician, my friend and colleague, Dr. Leighton, observed to me, that the most remarkable physical character of the Russians, among whom he resided, is their early senility. Very soon after forty they become aged. This observation, however, applies to the lower and middling classes, not to the nobility. Dr. Leighton informed me that the impression which he formed, living at St. Petersburg, as to the cause of this peculiarity, was, that it proceeded from the habitual use of the vapour-bath. The higher classes use the vapour-bath *occasionally* as a luxury; the lower classes use it as their exclusive mode of purification. The servant makes an item in his wages of the price of the weekly bath, which he takes winter and summer. The interior of the public baths in St. Petersburg is laid out in benches of different heights, and the steam is produced by water flowing over heated stones. The different elevation of the benches gives the bather a choice of temperature, the lower the cooler, the higher the more intense. After perspiring profusely, the bather resorts to another room, where water is poured upon him, hot, temperate, or cold, or each in succession, as he may prefer. Exposure to cold, and rolling in the snow after the bath, are used or practised by few. The effect of this strong alternation is bracing and agreeable, but requires custom and good stamina to sustain it. Alternate exposure to heat and cold, produced either by successive immersions in baths of different temperatures, or by the affusion of cold water immediately upon quitting the hot-bath, was among the practices in use among the ancients. Hippocrates, when speaking of regimen in diseases, and even in acute disorders, adverts to the precautions which the affusion of cold water in coming out of the bath demanded, according to the different kinds of affections to which the body had been exposed; and Galen treats of the same subject.

In England, vapour, hot air, and sulphur baths, are used exclusively medicinally, and, in appropriate cases, with the greatest advantage. The difference between the three, as to their general effects on the system, is inappreciable. Those, who are in health, may use either beneficially under the following circumstances:—

First; If of good stamina, but, by want of leisure, prevented taking adequate exercise. Every one is alive to the value of free transpiration. The case supposed is one in which the body is denied this relief by exercise. The vapour-bath is a ready substitute. But it must be recollected that, like most substitutes, it is not equal to its principal; and that frequently used, it is relaxing and exhausting. Used occasionally it will contribute, under these circumstances, very beneficially to the preservation of health. The only disadvantage which results from it, is the excessive appetite which it produces.

Secondly; If subjects of the gouty diathesis. It is believed that there exists a connexion between gout and acidity, difficult as it is to trace the link, or to follow its influence through the various stages of assimilation. Now the skin is a means of escape for superabundant acid. The perspiration is acid, and in proportion as it is profuse, it more completely rids the system of this principle. Theoretically, therefore, the vapour-bath should be a preventive of gout; and in practice I have seen its good effects; and have known great benefit derived from it, in cases where the diathesis has been strong, and no contravening circumstances have been present.

The Warm-bath.—The temperature which is understood by this expression is from 92° to 98° of Fahrenheit. Immersion in warm water at this heat has a prompt effect in soothing the nervous and vascular systems. This is most distinctly manifested in children, whose frames are more susceptible of external influences. Many of the fits of children, not to mention feverishness, and all sorts of inward pains and uneasiness, often give way directly to this therapeutic agent. In the treatment of the maladies of children the warm-bath is therefore invaluable.

Part of the agency of the warm-bath is to be attributed to its equalizing the circulation; the entire superficies of the body is excited by the equal heat applied to it, and the blood is equably drawn from within outwards. At the same time, and in connexion with this change, a new and agreeable sensation is equally diffused over the surface. The blood and the nervous energy being thus wholesomely derived to the skin, it is no wonder that many irregularities of internal action, congestion, constriction, spasm, should be relieved by it. Or it seems as if the entire frame were so harmoniously constructed, that if one or more parts go wrong (within moderate degrees of functional disturbance) it is enough to excite one important organ to measured and healthy action, and all the other threads and filaments of the frame will be drawn into their true and healthy tension and places. The efficiency of most pharmaceutical preparations is founded upon this principle, which is equally exemplified in the salutary effects of warm bathing. "Physicians," Lord Bacon observes, "should ingeniously contrive, how, by motions that are in their power, they may excite inward motions that are not in their power by consent." Nearly the whole of rational medicine is contained in this expression.

The temperature which is commonly preferred for the warm-bath is 95° or 96°. When the bath is taken for refreshment, it may be left to the feelings of the party to determine, within the limits before given, which is most grateful. Many persons prefer a higher temperature to that of 96°, few lower than 93°. To determine the proper temperature by the sensations, the rule is to maintain a feeling of comfortable warmth. Above the temperature of 98° the bath ceases to refresh and soothe; it heats and excites, and the excitement is followed by exhaustion. From 98° to 112° it is termed a hot-bath, and becomes a temporary, but powerful stimulant, available in some forms of disease, but placed out of the domain of *Hygiène*.

The ordinary period for the use of the warm-bath is half an hour; its effects are hardly obtained under fifteen minutes, and the protraction of the period for an hour renders it relaxing. At first even a warm-bath is slightly stimulating ; time must be given for that influence to subside, which is gradually succeeded by soothed and tranquillized sensations, and an agreeable physical serenity. The principal occasion in health for a warm-bath is after fatigue, as on coming off a journey, or a day of severe bodily exercise.

There are some, to whom warm bathing is perilous; these are either, on the one hand, persons of a full habit, who are liable to flow of blood to the head, which the warm-bath promotes; or, on the other, persons who are debilitated and relaxed, whom the practice may injuriously lower. The first are liable to suffer from the stimulating effects, the second from the relaxing effects, of warm bathing.

The remarks which have been made apply to baths of water unimpregnated with saline or other extraneous substances. These mixtures, which constitute the waters of the sea and of mineral springs, modify the agency of the warm-bath. They are sensibly stimulating, and correct the lowering effects which belong to simple warm bathing. Accordingly, to those who are strong, after fatigue, much more refreshment is conveyed by a warm sea-bath, than by an ordinary warm-bath; and many of those, who are of that exhausted habit or feeble diathesis, that they would be prejudiced by the latter, take the former with benefit and sensible improvement of strength. The length of time that immersion may be continued in the mineral baths of Germany, and the salubrious influence which they exert, the reader will find described in Sir Francis Head's "*Bubbles from the Brünnens of Nassau.*"

The best hours for taking a warm-bath are either the afternoon or evening. That is to say, the bath should be followed by a period of rest; an hour or two of rest before dinner, or an hour of reading, with a night's sleep afterwards, are the wholesomest sequences of an hour in the warm-bath.

The soothing influence, which the warm-bath produces on the entire frame, may be partially obtained by the same means. Instances of this kind are of daily occurrence. But one which fell under my observation recently is the most striking that I remember.

A young woman, nineteen years of age, was admitted into the Middlesex Hospital with her foot drawn upwards, in pain, and useless. She had twice before experienced the same affection, which had lasted several weeks. I directed the local application of belladonna and the shower-bath. No amendment, however, followed; she thought herself rather worse. I then desired that the foot and leg should be every night immersed in water as hot as she could bear it (the other remedies being omitted). The next morning she was better, and in a few days left the hospital quite well.

Cold Bathing.—In the effects of the warm-bath two periods are observed; the first, the one of excitement,—the second, of soothing and relaxation. In the *judicious* use of the cold-bath two similar periods, but in which the order of the alternation is reversed, occur, and alone occur. The first period is marked by depression; the temperature of the surface is suddenly lowered, the skin shrinks and contracts, the blood recedes from the surface, the heart acts less vigorously, there is a disposition to shiver, attended with sensible diminution of muscular power. So lowering is the first and direct agency of the cold-bath, that death has sometimes been its immediate consequence.

Three things add to the depressing influence of the cold-bath: the first, bodily weakness; the second, the severity of the cold; the third, the mode of immersion.

Any temperature from 33° to 70° is ordinarily considered a cold-bath; but the effects of the extrêmes are very different. Dr. Richardson mentions in extenuation of his being dragged out benumbed and senseless from a rapid, at 38° of temperature, which he had attempted to cross by swimming:—"I should have had little hesitation at any former period of my life at plunging into water even below 38° of Fahrenheit; but at this time I was reduced almost to skin and bone, and, like the rest of the party, suffered from degrees of cold that would have been disregarded in health and vigour*."

The lowering effect of gradual immersion is animadverted upon by Galen; who appears, however, to have entertained unfounded apprehensions of the general effects of cold bathing upon the system. He recommends that cold bathing should be preceded by frictions, *quicker and harder than usual*; and that the customary unctions should be succeeded by violent exercise: after these preliminary practices, "*Let the bather plunge in quickly; because nothing can bring on a greater degree of shivering than entering gradually into cold water, when the parts of the body are affected in succession.*"

The temperature of the bath is then to be regulated by the strength of the bather; and the mode of immersion should be a plunge.

Where the cold is not too great for the strength, and the immersion is a plunge, reaction follows instantaneously. The *shock* seems to be directly stimulating. It is difficult, indeed, to separate in idea the shock from the refrigerating effect, or the immediately exciting from the directly depressing influence of the plunge; like the parallel effects of opium, it is conceivable that they may go together. Those who are accustomed to opium are composed and excited by it, with no succession, but simultaneously; cold water, again, sprinkled upon a swooning person, certainly directly excites;—so one plunging into a bath may be excited perhaps at once and lowered.

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* Sir J. Franklin, narrating the incident, remarks, "I have omitted to mention, that when Dr. Richardson was about to step into the water, he put his foot on a dagger, which cut him to the bone; but this misfortune could not stop him from attempting the execution of his generous undertaking."

As, however, the lowering effect is at its maximum at the instant of immersion, and the exciting effect perhaps at its minimum, every means should immediately be used by the bather to encourage reaction. If he is in strong health, he is to strike out, and by the exercise of swimming to promote or increase the glow, which supervenes. In the opposite extreme, when he is in such debility as only just to bear the bath, he is instantly after the plunge to leave the water, and to be well dried and rubbed with towels, in order to bring on and assist reaction, which else might fail.

These are the extremes;—the bather may continue in the cold element, baffling its depressing influence by muscular exertion, and deriving strength from the vigorous reaction of his system;—or he may artificially be made to derive benefit from an immersion, of which the natural result would have been to lower and exhaust his feebler powers.

There is a limit, of course, to the period of bathing for the strongest. After a time he becomes tired, reaction flags, his powers fail, and he is chilled by the element, which he has now no means of resisting. Bathing protracted to this extent is debilitating, and therefore hurtful.

In general, from ten to twenty minutes is a full period of immersion, even for the strongest. But this time is too long for any in winter; while in a warm season it allows of being greatly extended.

The best hour for bathing is the morning, before breakfast.

Those who have bathed during the autumn, and are in full possession of strength, and gaining more through it, may continue the practice during winter; but it is not safe, *unadvisedly*, to commence cold bathing at that season.

The inhabitants of Rome boasted of the hardihood with which they immersed their bodies in the coldest water. Seneca makes it a subject of exultation, and says of himself, "Ille tantus Psychrolutes, qui kalendis Januariis in Euripum saliebam." Swimming also was peculiarly regarded as an essential part of the education of youth; and the same importance was attached to it, as to reading or knowledge of letters: "He has learned neither to read nor to swim," was the character given of a person whom they wished to stigmatize as grossly ignorant.

It is wonderful, when the strong effects on the system of a single cold-bath are considered, how much its influence is lessened by use.

Cold bathing may be taken either in spring-water, or in sea or mineral-water. Experience has satisfactorily proved, that the effects of immersion in pure water, and in water containing salts in solution, are different. Sea-waters, and mineral-waters, particularly such as contain sea-salt or iron in solution, are more tonic, bracing, and stimulant, than simple water, and when used as a cold-bath are productive of greater reaction than the latter.

The period of the year best adapted for sea-bathing is, of course, the summer and autumn, at which seasons the temperature of the sea on our shores varies from 55° to 70°. The time of bathing in the open sea must depend, in many places, on the state of the tide. It deserves to be remembered that the temperature of the water may be very different at different times, according to the circumstances of the locality, the hour of the day, and the period of high water. If the shore consists of level sand or shingle, the tide which flows in the afternoon, over a large expanse of surface heated by the noonday sun, will often be a good many degrees higher than the morning tide in the same place.

The following memorandum shows the temperature of the sea at Bognor, on the coast of Sussex, in the summer and autumn of the year 1831:—

On the 4th of July, at mid-day, the temperature of the atmosphere being 72°, the sea was 69°.

July 12. 7 A. M. atmosphere 63° sea 66°

Aug. 3.	8 P.M.	atmosphere	65°	sea	71°
— 11.	1 P.M.	——	70°	—	71°
Sept. 5.	8 A.M.	——	64°	—	65°
Oct. 29.	11 A.M.	——	60°	—	54°*

When the bather is not in rude health, the temperature of the water is an important subject of consideration. For this reason, from eleven to midday may be preferable to the early morning; as well as because the system, recruited by the first meal, now digested, has reached perhaps its greatest diurnal strength.

The most convenient form of cold bathing is the shower-bath, which, already in frequent use, deserves to be more generally employed. In it every element that is of use in cold bathing may be accurately adjusted to the wants of the bather. The temperature of the water; its state, whether pure or mixed with salts; its quantity; add to which even the combination of warm bathing with it, (for example, the patient standing in warm water while the shower of cold water pours upon the head and shoulders,)—admit of being infinitely varied: and the bath is in your dressing-room.

In all forms of hysteria the shower-bath is of the greatest efficacy. I have seen cases of contracted and painful joints, which presented several of the characters of structural disease, in which the pain and contraction have vanished under the use of the shower-bath.

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* Forbes's *Cyclopædia of Medicine*. Art. BATHING.

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I KNOW not under what other head than the present to introduce rules for the conservation of different parts.

"To restore TEETH in age," observes Lord Bacon, "were *magnale naturæ;* it may be thought of." What the philosopher anticipated, modern art has accomplished; and an element towards lengthening the duration of life has been added by the increased power of masticating and improved digestion, which the aged thus obtain.

However, Dr. Rush remarks, "I have not found the *loss of teeth* to affect the duration of human life so much as might be expected. Edward Dunker, who lived to be one hundred and three years old, lost his teeth thirty years before he died*."

Dr. Sayre, of New Jersey, mentions one man, aged eighty-one, whose teeth began to decay at sixteen; and another of ninety, who had lost his teeth thirty years.

* Dr. Rush observes, "I have not observed baldness or gray hairs, occurring in early or middle life, to prevent old age." One of the instances given by Dr. Sayre, is an account of a man of eighty-one, whose hair began to assume a silver-colour when he was only one-and-twenty years of age.

In age, the gums, by becoming hard, perform in part the office of teeth.

Nevertheless, it is a most important object to preserve the teeth, which Nature gives us, as long as possible. For this purpose the teeth should be brushed three times a day, *water with the chill off* being always used; and the more effectually to clean the teeth, as well as to strengthen the gums, it is desirable to employ, night and morning, a tooth-powder (consisting, for example, of an ounce of prepared chalk, half a drachm of myrrh, and two drachms of orris-root). The tooth-brush should be moderately soft.

Perhaps the spread of habits of personal niceness cannot be better exemplified than by the following extract from Sir John Sinclair's treatise, published only thirty years ago.

"The Chinese recommend it as an important rule to wash the mouth, and to rub the gums and teeth with a brush, before going to bed. This gives the mouth and tongue an agreeable freshness; and, *though the practice seems at first a little troublesome*, you will soon become accustomed to it, and feel uncomfortable if it is omitted, more especially as it has a tendency to promote sound sleep."

The EARS often require attention in childhood, and in persons advancing towards age. In strumous children a discharge of matter is liable to take place from the ear, which, unless checked, leads to thickening and early deafness. Syringing the channel of the ear with warm milk and water, and lightly cleansing it with soft lint, is always the safest, and generally the best method of locally treating this ailment; which sometimes, however, requires other means to dry up the moisture. In aged persons the cerumen of the ear, drying and accumulating, often occasions a deafness, which may be removed by the removal of the wax; this cannot be done by the ailing person himself.

Deafness is hereditary in some families, coming on usually between twenty and thirty years of age. Deafness of one ear is exceedingly common. Instruments to assist hearing have been much improved of late. The best instrument for conversation with a single person is the ear-trumpet with an elastic tube; for society, the ear-cornets recently introduced are very convenient and useful. All persons moderately deaf hear with facility a single person speaking, while they are distracted by the buz of general conversation, of which they hear nothing. There is a singular difference, however, among the deaf; and unexplained, as to this point. Some hear best in perfect silence and tranquillity; others, on the contrary, have their hearing improved when their frame is in the greatest jar and vibration, as in a carriage driven over the stones. Deaf persons distinguish more easily the words of familiar voices than of strangers; and their hearing is really capricious, being influenced, not by their attention alone, but by some unexplained cause besides.

The EYES require the greatest care. In the morning, in the afternoon, after exposure to sun and dust, or to the glare of snow, and at night, it is desirable to bathe the eyelids with tepid water, drying them gently with a soft towel. The eyelids should never be rubbed. After first using warm water, bathing the eyelids with very cold water is strengthening and salutary.

When the eyes are weak, the use of coloured spectacles, under strong lights, is a proper precaution.

For a long time green spectacles were in use to screen the eyes, but the disagreeable colour which they impart to objects caused them to be superseded by blue glasses. There is, however, a great objection even to blue spectacles; they do not mitigate the blue rays, which fall upon the retina in their natural intensity, so as to distress the sight when directed towards white surfaces strongly illuminated,—such as snow, or stuccoed houses, or the flag-stones of pavement under a summer sun. To obviate this inconvenience and prejudicial effect, (necessarily, indeed, belonging to all coloured spectacles,) Mr. Newman, of Regent Street, has made, at my desire, *gray* spectacles, the effect of which is extremely pleasant, when the sight is weak. The same object had been aimed at in the introduction of gauze spectacles; but these are found to have a different but equally serious disadvantage, they *heat* the eyes. The gray glasses made by my direction are a *pure black* diluted. This is not as easily obtained as might be supposed; for almost all the black glass in use for beads, and the like, black as it appears, is either a deep red or a deep blue.

A child which was under my care, and which had temporarily lost its sight from the intense glare of lightning, in the progress of recovery, for a time saw all in shade. Everything was one colour; she could read with a strong light, but could not tell yellow from blue or red. Afterwards the discrimination of colour returned.

No one should keep his eyes directed to a fire, or lamp, or candle, (which one has a natural tendency to do,) or habitually sit facing a window with a bright light, or expose his eyes to sudden and violent transitions from light to darkness, or the reverse. Candles are better than lamps with shades, to read by, because they avoid this alternation, and their light is less intense. A medium should be sought in artificial light between that which is so bright as to fatigue, and so imperfect as to strain, vision.

The use of glasses is, if possible, to be avoided. The sight admits of being strengthened by exercise. Vision which is slightly defective, or disposed to short-sightedness, *may be recovered, and its* *sphere extended by use;* whereas, the constant employment of glasses is sure to contract its range more and more. This is very evident in those who use a single eye-glass; in that case the vision of the right eye (being the eye to which the glass is commonly applied) gradually becomes more defective than that of the left. The increase of short-sightedness in the present day is owing to the joint influence of increased habits of reading, and the use of glasses.

On the other hand, the *occasional* use of glasses, by either young or old, whose vision is defective, contributes to strengthen the sight; in one way, by relieving the nerve from the strain of imperfect vision; in another, by teaching the retina what perfect vision is.

CHAPTER V.

OF CLOTHING.

THE use of clothing is to protect us against cold and damp,—or rather against cold; for wet is only a mode of applying cold, in which, however, its agency is more than usually deleterious; first, because moisture in some manner relaxes the frame, and renders it more susceptible than usual of lowering impressions; secondly, because it accidentally happens, that the occasions on which cold and damp are united, are generally of an enduring kind. But what can be more capricious than the effects of cold? We shrink from casual exposure to rain, or drafts of air, or wet feet; and instances are perpetually occurring, wherein the neglect of such caution has produced, in seemingly healthy persons, serious, or even fatal, attacks of illness: the chill received produces depression of nervous power, and of the circulation;—reaction follows, partial, concentrated, sometimes destructive.

In other instances, it seems as if the human frame were iron, and impassive to cold, neither lowered by it, nor reacting. Take for instance the circumstances mentioned in the following passage from Sir John Franklin's *Narrative*, which seem to have produced no ill effects on those who encountered them:—

"Having searched for a part where the current was most smooth, the canoe was placed in the water, at the head of a rapid, and St. Germain, Solomon, Belanger, and I, embarked in order to cross. We went from the shore very well, but in mid-channel the canoe became difficult to manage under our burden as the breeze was fresh. The current drove us to the edge of the rapid, when Belanger unluckily applied his paddle to avert the apparent danger of being forced down it, and lost his balance. The canoe was overset in the middle of the rapid. We fortunately kept hold of it, until we touched a rock where the water did not reach higher than our waists; here we kept our footing, notwithstanding the strength of the current, until the water was emptied out of the canoe. Belanger then held the canoe steady, whilst St. Germain placed me in it, and afterwards embarked himself in a very dexterous manner. It was impossible, however, to embark Belanger, as the canoe would have been hurried down the rapid, the moment he should have raised his foot from the rock on which he stood. We were, therefore, compelled to leave him in his perilous situation. We had not gone twenty yards, before the canoe, striking on a sunken rock, again went down. The place being shallow, we were again enabled to empty it, and the third attempt brought us to the shore. In the mean time, Belanger was suffering extremely, immersed to his middle in the centre of a rapid, the temperature of which was *very little above the freezing-point*, and the upper part of his body covered with wet clothes, exposed in a temperature *not much above zero, to a strong breeze.* He called piteously for relief, and St. Germain, on his return, endeavoured to embark him, but in vain. The canoe was hurried down the rapid, and when he landed he was rendered by the cold incapable of further exertion, and Adam attempted to embark Belanger, but found it impossible. An attempt was next made to carry out to him a line, made of the slings of the men's loads. This also failed, the current acting so strongly upon it, as to prevent the canoe from steering; and it was finally broken and carried down the stream. At length, when Belanger's strength seemed almost exhausted, the canoe reached him with a small cord belonging to one of the nets, and he was dragged perfectly senseless through the rapid. By the direction of Dr. Richardson, he was instantly stripped, and being rolled up in blankets, two men undressed themselves, and went to bed with him: but it was some hours before he recovered his warmth and sensations. As soon as Belanger was placed in his bed, the officers sent over my blankets and a person to make a fire. Augustus brought the canoe over, and in returning he was obliged to descend both the rapids before he could get across the stream; which hazardous service he performed with the greatest coolness and judgment.

"It is impossible to describe my sensations as I witnessed the various unsuccessful attempts to relieve Belanger. The distance prevented my seeing distinctly what was going on, and I continued pacing up and down upon the rock on which I landed, regardless of the coldness of my drenched and stiffening garments. The canoe, in every attempt to reach him, was hurried down the rapid, and lost to view amongst the rocky islets, with a rapidity which seemed to threaten certain destruction; once, indeed, I fancied that I saw it overwhelmed in the waves. Such an event would have been fatal to the whole party. Separated as I was from my companions, without gun, ammunition, hatchet, or the means of making a fire, and in wet clothes, my doom would have been speedily sealed. My companions, too, driven to the necessity of coasting the lake, must have sunk under the fatigue of rounding its innumerable arms and bays, which, as we have learned from the Indians are very extensive. By the goodness of Providence, however, we were spared at that time, and some of us have been permitted to offer up our thanksgivings, in a civilized land, for the signal deliverances we then and afterwards experienced."

The causes, which enabled Franklin's toil-worn party to survive this and similarly severe physical trials were three; *use, abstemiousness running hard upon starvation, and strong mental tension,* —the resolution to struggle on against every chance, sustained or produced by the example of their intrepid chief.

It is curious to contrast with this picture of physical endurance, the precautions taken against cold in the process of developing by high training the utmost resources of physical strength. During training, the dress is scrupulously changed after each period of exercise; flannel or calico is always worn next the skin:—and even for his noon repose, the athlete undresses and betakes himself to bed. I inquired why these precautions are used, of Mr. Jackson, who told me that their object was "not to throw away a chance," in other words, to avoid the smallest risk of rheumatism or cold: but it is far from improbable, that with the *high feeding* and full vigour of a person under training, an increased tendency to inflammatory attacks exists; and that these precautions are of more consequence then than otherwise.

Certainly those who feed highly, and, at the same time, take a fair proportion of exercise, are more liable to ordinary inflammatory attacks, from exposure to cold, than those whose habits are abstinent.

There is, no doubt, a mean, which is the most desirable. The following extracts show, that the direct influence of cold *upon their sensations*, was heightened in Sir John Franklin's party by the greatest rigours of privation, which they encountered.

" During the whole of our march we experienced that no quantity of clothing could keep us warm, while we fasted; but on those occasions, on which we were enabled to go to bed with full stomachs, we passed the night in a warm and comfortable manner.

"Our plentiful cheer (a remark occurring towards the close of their toils) gave such power of resisting the cold, that we could scarcely believe otherwise than that the season had become milder."

The influence of use, in enabling the frame to resist cold, Dr. Edwards has illustrated by some very decisive experiments. At the end of the cold season animals are more hardy than at its setting in. They are found to have acquired the power of forming an increased quantity of heat; the supply has been enlarged with the demand.

The subject of animal heat remains, indeed, involved in great mystery. Physiologists cannot be said to know, why it is necessary that an uniform temperature should be maintained in our frames; a temperature, too, the standard of which varies in different animals, that might be considered nearly upon a par in completeness of internal organization. The standard temperature of the human body is 98°, or one or two degrees higher; judging from Dr. Beaumont's observations, we may conclude that the temperature of the blood has been usually underrated, and is really 100°, as in sheep and oxen; the temperature of the cetaceous mammalia is 104°; of birds 107°. It is perhaps easy, if we give a loose to conjecture, to imagine, knowing in how great a degree temperature influences chemical changes, that a definite heat is requisite for the thousand fine operations that are simultaneously going on in the animal frame. But as yet the relation of that heat to any of these changes has not been determined. The source of the vital heat is still less understood. Its production bears, it is true, a remarkable relation to the quantity of oxygen consumed in breathing; yet it has been satisfactorily proved by the experiments of Sir Benjamin Brodie, that breathing is not the source from whence heat is immediately derived. The nervous system, as the part which is least understood in the economy, and the influence of which is the most mysterious, is that to which speculative persons in medicine delight to refer what they do not understand. Accordingly, the last definite idea which has prevailed upon this subject is, that the brain and nerves furnish animal heat. There is, however, every reason to suppose this opinion erroneous. The instances in which the temperature of the animal body rises the highest are, where nerves or the spinal marrow have been divided. The greatest heat has been produced where the agency of these parts has been excluded. Add to this striking fact, that plants exhibit in a wonderful degree the power of forming heat, while they are supposed, with reason apparently, to want anything like a nervous system. The truth seems to be, that the relation of temperature to the nerves is the same with the relations of all the functions of vegetative life and growth. The powers which produce them are the vegetative powers of the frame; the influence of the nerves is limited to regulating the rate of production, by ascertaining the quantity wanted, and communicating the want to the recruiting energies of the body.

In early infancy the frame is highly susceptible of cold, and requires the greatest protection against it by clothing and external warmth. Dr. Edwards has shown experimentally that the power of producing heat in warm-blooded animals is *at its minimum at birth, and increases progressively to adult age;* and instead of young animals being warmer than adults, they are generally a degree or two colder, and part with their heat more readily. In two healthy infants, from two hours to a few days old, the mean temperature was observed by Dr. Edwards to be only 94°·55 Fahr., that of adults being 97° or 98°; and in a seven months' child, three hours after birth, he found the temperature so low as 86°·6, although the child was well clothed and near a fire. The following instance is a more serious corroboration of the physiological principle. In France it is customary to carry infants, a few days after birth, to the office of the *Maire* for registration; Dr. Edwards ascertained that the number of deaths of infants in France is greater in winter than in summer, in the northern than in the southern provinces, and in parishes where the inhabitants are scattered at distances from the residence of the *Maire*, than where they are congregated near him.

Old people are extremely sensible to cold; they are easily chilled; their warmth not easily restored; and many of the ailments, which terminate their existence, directly proceed from cold. Dr. Rush mentions in (addition to facts already given on the same authority), that the servant of Prince de Beaufremont, who came from Mount Jura to Paris at the age of 121, to pay his respects to the first National Assembly of France, shivered with cold in the middle of the dog-days, when he was not near a good fire. The National Assembly directed him to sit with his hat on, to defend his head from the cold.

But while, influenced by these and parallel facts, we conclude it to be right carefully to fence from cold young children and the aged by warm clothing, what rules are to be laid down for the intervening periods?

If the frame should, on the one hand, be protected against injurious cold,—on the other hand, is there not a risk, by using too much precaution, of rendering the body relaxed, delicate, and unusually susceptible, against the occasions, which chance will bring round, of unavoidable exposure. In persons of a good constitution, this risk appears to me of more moment than the other; and I have little doubt that the greatest security against illnesses which cold produces is obtained by the habit of disregarding cold and exposure to weather. One thing only is to be carefully avoided, which is the continuing in wet clothes after bodily exercise is over. It is, in fact, then only that wet and cold are dangerous.

We may conclude it to be best, in this climate, to clothe boys with flannel, to protect them against the damp produced by exercise. Under training, a common person habitually wears flannel, as well as changes his dress as soon as his violent exercise is over. The latter precaution cannot be taken with boys; the first may be sufficient. It is, of course, no valid argument against taking this precaution that many boys thrive and continue in the hardiest health who have not taken it. The question is, whether a larger proportion would not escape illness by pursuing it.

The capricious nature of our climate is the consideration which turns the scale in the favour of the care which has been recommended, joined with the numbers who perish of pulmonary disease; to which, who can say how much incautious exposure to cold may not have contributed? In the beginning of winter, and in the bitter north-easterly winds of our spring, no one escapes colds. This is owing less to the severity, than to the alternations of our climate. We seldom thoroughly fence ourselves against cold, for the next day may be mild and genial; or if we have made adequate provision against temperature, a few days of open weather throw us off our guard. Almost every one of a strong constitution, and not more careful than others, incurs seasoning colds more or less severe; not, however, without a perfect recollection, and often observation at the time, of the circumstances which cause the chill, of which the reaction is his inflammatory seizure.

In general, cold is caught by the feet,—the shoes wet and not changed; even stockings too thin, or the adoption of French boots in place of English, or any cause as trivial, I have known produce severe colds. Exposure to the night-air carries with it particular hazard. Every one should, on such occasions, muffle his face with a handkerchief, so that the chill of the air he breathes may be taken off. For the use of persons with delicate lungs, Mr. Jeffreys has invented a very scientific and useful instrument, which he calls a *respirator*, well adapted to the same object; it may be worn without interfering with the voice, yet serves as a sufficient warmer of the air that is breathed. There are many who may venture to take exercise in the open air in cold weather with this protection, who hitherto have not, or ought not to have encountered it.

It is in hot climates that the prejudicial effects of night-air are principally experienced; the cool is luxurious, but it is death. The dangers of a hot climate are from cold.

The late General Pye, who was some time Governor of Honduras, told me many years ago, that for his time he had preserved an unexampled salubrity among the troops under his command by compelling them to attend strictly to their clothing, never to mount guard at night without their great coats, and the like.

The following story to the same purpose is so pertinent, that I shall quote it in the words of the able writer, with whose opinions upon this subject I have no difference. It describes the salutary precautions, (and their favourable result,) adopted by Captain Murray, R.N., when ordered, to a West India station:—

"Conceiving most of the West Indian diseases to arise from exposure to damp, after the body had been acted upon, and laid open to its influence, by the great heat during the day, he laid in, before leaving England, a double set of flannels for every man on board; and, on approaching the warm latitudes, he desired one set to be served out and regularly worn. Many of the crew, troubled by the irksomeness at first felt, were highly dissatisfied, and stated that they were not obliged to wear flannel, and that they would not do so. Captain Murray got rid of this difficulty by putting them in mind that they were bound to obey *orders*, under pain of being treated as mutineers: and instantly wrote an order, in regular form, that no man in the ship should be seen without flannels; and this order was of course obeyed during the remainder of their service; and, as will presently be seen, with the very best effect.

"Another powerful cause of disease, in warm climates, is the practice in which seamen indulge, on being relieved on the night-watch, of turning in to sleep in their damp or wet clothes. This also Captain Murray resolved to avoid; and accordingly made it an invariable rule, that before the officer whose watch had just finished, should go to sleep, he should see every man who had been on watch with him, change his damp clothes for dry ones, before turning into his hammock. This, Captain Murray said, detained the officer perhaps ten minutes; but the effect was exceedingly gratifying. The detrimental influence of sleeping in connexion with anything damp, was very great; more so than was generally supposed; and was nowhere, he said, better shown than by the increased salubrity which immediately followed even the amputation of the long tails which sailors formerly wore. When these were wetted by rain, by spray, or even by damp alone, it was impossible to dry them in many hours; and, even when the crew changed their clothes, the long cold damp tail was always there, in close contact with the back, infusing rheumatism, fever, inflammations, and other grievous afflictions, through the medium of the spinal column, and its numerous nerves, into all the organs of the body. All of which evils were greatly diminished by the abstraction of the offending cause.

"Moisture, acted upon by heat, is the bane of warm climates: and heat alone is infinitely less pernicious. Captain Murray, on this account, abolished the practice of daily washing and scrubbing the decks, so long looked upon as a first duty in a man of war; and which kept up a perpetual or at least a constantly-recurring source of humidity. From the time he left England till his return, a period of three years and a half, the lower decks had not been once wet, but were kept clean by holy-stoning and dry scrubbing; and, by avoiding these most active causes of disease, he succeeded in spending upwards of three years, in the ordinary duties of a West India station, without losing a man; and, so far from disliking the station, he thinks it one of the most eligible that is to be found for an active and enterprising officer; and, in conformity with this view, begged, as already stated, to be sent back there from the North American station."

The importance of considering dress in the physical education of female children has been already adverted to. Unless some special reason is present, it should be such as to produce no compression. Their health and strength should be so maintained by proper exercise and repose, as to remove all necessity of extraneous support. But like every rule, this is made to be occasionally broken; the frames of some must be carried through temporary delicacy by the very means which would enfeeble hardier ones.

There are other relations of a miscellaneous character in which clothing may be viewed.

The manners of a nation bear a natural ratio to their clothing; both originally take an impress from the same cause. The close-buttoned dress goes with the apathetic bearing of the Northern European; his arms folded close to his side help to keep him warm. The profusion of action and expansive gestures of the Southern match with his lighter dress and flowing garb, favouring the percolation of air and coolness. But in times of continued peace and free intercourse, national differences insensibly disappear. The characteristic gestures of each are reciprocally exchanged or modified. This is partly the intentional adoption of what strikes as pleasing and in good taste on the part of our neighbours, partly the instinctive operation of the imitative principle*.

Dress, again, like handwriting, or the manner of knocking at a door, bears a relation to individual character†. When overstudied or eccentric, it denotes some infirmity of conceit or taste; when neglected, want of a due estimate of the value of the conventional rules of society.

Attention to dress, in connexion with the habits recommended in the chapter immediately preceding, should be the more cultivated by the young, that they may not neglect these practices in age.

In clothing, the capricious element which constitutes Fashion becomes tangible and susceptible of analysis. Fashion is the same compound whether displayed in dress, expression, manners.

What gives its value to a fashion is, partly, association. That pleases, which is used by those who possess social rank and mental refinement, simply because it is theirs.

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* The finest instance of the imitative principle occurs in singing birds, which brought up with another kind, learn *their* notes, instead of practising those of nature's prompting. The most humorous instance is this:—if, when three or four persons are sitting at a table, and engaged in conversation, you, seemingly without design, take up the snuffers and slowly open them to the utmost, and shut them several times, one or two will fall into an imitative yawn.

† Dress, to a certain extent, reacts upon character. This principle, in one extreme, furnished an image to the Earl of Douglas, after being wounded and made prisoner at the battle of Shrewsbury:—"Poortith takes away pith;" the Earl observed "and the man sits full still that has a rent in his breeks."

Fashion, besides, is ever changing; and change is agreeable in itself;—and the last fashion has already lost its distinguishing character through the participation of "the general."

But what determines fashion, from the colour of a cravat to the inclination of a bow, from the mode of drinking wine, to the choice of the wine you drink? In the smallest minutiæ of external bearing, an harmonious progression, and infinite series of agreeable impressions is obtained or studied. Is it accidental what next succeeds? I imagine quite the reverse; that takes only as fashion, which, having a certain analogy to the last custom, forms a natural and graceful transition: its merit being half in itself, half in its relation to the last. So the varied colours and shape of a bonnet are in the order of Nature, and succeed each other by definite laws, which cannot be violated with impunity. Perhaps the strongest exemplification of the power of fashion is to be seen in Dr. Meyrick's gallery of ancient armour, in which, during a single reign, the same mutations in the shape of the breastplate are to be seen, as of late in ladies' sleeves: the tempered Milan steel was as pliant to the caprice of fashion as blonde or sarcenet.

Dress has even a relation to literature. The linen that is part of it becomes the vehicle of letters. The invention of printing would have been of little use without the invention of paper; that is to say, of a cheap material on which to print. It is remarkable, that the modern inundation of cheap literature is on the eve of receiving a check through this cause. The flood of cheap knowledge has nearly reached its highest level, and before long must begin to subside; unless, in the progress of art, some equivalent is discovered for linen rags. Cotton mixed with linen has been tried, but it prevents or lessens cohesiveness, and renders the paper rotten and perishable. The culture of flax for this purpose would not answer, as it supposes a much higher price of paper than the present. The present low cost of paper results from its being formed of the refuse rags of Europe. But these will shortly be unattainable in sufficient quantity; American literature robs us of a portion, and at the same time our own demand is increasing.

The principal supply of rags, again, is from Germany; but the literary fertility of Germany increases with our own, and the German publisher now claims, for home consumption, the worn-out blouse of his countryman*. The diffusion of knowledge will thus be checked, because population, or its linen clothing, does not increase in the same ratio with the diffusion of reading.

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* The best paper that has been made, was contrived for the American notes, which, as their currency required them to possess the greatest durability, were made of Irish linen and Bandana handkerchiefs.

CHAPTER VI.

OF AIR AND CLIMATE.

THE practical rules, which flow from the subject now to be treated of, apply to CHOICE OF RESIDENCE, and are grounded upon the comparative salubrity of different districts and situations. The arrangement which I propose to follow, in the ensuing remarks, will be thought sufficiently arbitrary; but I adopt it on account of its convenience, and because it gives prominence to the more popularly important relations of the subject: I have to premise, likewise, that I shall not limit myself to the considerations which this inquiry directly suggests, but shall introduce topics, that, if excusable on account of their present interest, have little to do, except by a metaphor, with the title of the present chapter.

I propose to notice, *first*, the general properties of the atmosphere,—the atmosphere of cities, as influenced by mixture with the produce of combustion, and of animal exhalation and decay,—the atmosphere of the country as contrasted with that of towns, the advantages arising from mineral and saline mixtures with the air,—the differences produced by different degrees of temperature and moisture.

Under a second division, I shall treat a subject of great practical importance in this country; namely, climate,—in reference to the strumous diathesis.

Thirdly, *malaria*, or the influence of the mixture of decomposing vegetable matter with the atmosphere.

Fourthly, the climate of the factories.

I. GENERAL PROPERTIES OF THE ATMOSPHERE, &c.

THE atmosphere essentially consists of two elements, nitrogen namely, and oxygen, in the proportion of 79 parts of the former to 21 of the latter. Such Gay-Lussac found to be the chemical constitution of the air at the height of two miles above the surface of the earth; and such it is likewise found to be in the heart of the most thickly-peopled metropolis. The law which determines the mixture of the two gases in these proportions is not known, but it has prodigious force and rapidity of operation. In a crowded assembly, a vast amount of oxygen is disappearing at every moment, being absorbed in breathing, and an equally large amount of carbonic acid is given out. Yet the only difference, when the air of the room is tested, as regards these elements, is, that one or two parts of carbonic acid are found in a hundred of the atmospheric mixture. So our knowledge goes to this only;—it suggests the following questions, for which, as yet, no answer has been found.

From whence is the oxygen ultimately derived, which replaces that consumed by animal life?

What is the principle, upon which the constant proportions of the nitrogen and oxygen of the atmosphere depend.

The air of CITIES contains two foreign elements, which are noxious to health, although generally in a far less degree than would be supposed.

The first, which is dependent on the coal consumed, (and bears a direct proportion to it,) is acid sulphurous vapour. The chemical operation of this element in London struck M. de la Rive very forcibly, who was led to its consideration by observing the extent to which the iron rails in London are corroded, where they are soldered into the stone. The decomposition arises from voltaic action; two metals, the iron and the lead, are in contact; an acid liquid is wanted to complete the pile; this is the rain-water, loaded *with the fumes of combustion.* It may be presumed that asthmatic persons to whom the air of London is noxious, suffer from the sulphurous vapour irritating the lungs. The carbon which floats in smoke is perfectly innocuous.

The other contaminating element of the atmosphere of cities is animal matter, either of exhalation or decomposition. The former is detrimental, and is, I suppose, in great measure the cause of the depressing character which belongs to the air of great cities. The exhalations in hospitals display this influence in its most concentrated form, owing to the number contained in the same space, and the occasional peculiar unwholesomeness and quantity of exhalation. Accordingly, patients, who are received into hospitals for slight ailments, seldom pass two or three weeks in the wards without experiencing a slight attack of fever, that is evidently brought on by the atmosphere they breathe. This fever, when the weather changes to warm and moist, or cold and moist, often puts on the character of erysipelas. I have known the exhalations from the sick on one or two occasions to be so poisonous as to produce on the instant violent vomiting, followed by dangerous fever. One of the worst forms of spreading disease is termed hospital gangrene. Dr. Hennen, in his "*Military Surgery*," observes that by an analysis of the air in wards affected with this contagion, M. Brugmans ascertained that there exists in it a peculiar animal matter highly disposed to putrefaction.

The decomposition of animal substance (*not of a morbid origin*) does not appear to be equally prejudicial to health. The medical student, who is diligent in his attendance in hospitals, is often compelled to desist by ill health; which had not happened to him, when prosecuting anatomy. M. de Noe mentions, in his "*Mémoires relatifs à l'Expédition Anglaise de l'Inde en Egypte*," how little injurious to health the mass of putrefaction attending the oyster-fishery in a hot climate is found to be;—"Although millions of oysters are putrefying under a burning sun, in the very midst of a dense and promiscuous mass of human beings, filling the atmosphere with a most intolerable stench, sickness is hardly known." In like manner, in the process of grinding bones in this country for manure, a smell the most dreadfully offensive attends the operation, yet the men who are constantly inhaling this odour, are exceedingly healthy. Butchers, tripe-men, tanners, candle-makers, are all exposed more or less to the effluvium from animal matter, in various degrees of decomposition, and yet are far from being unhealthy; or rather, the degree of unwholesomeness in these cases bears no proportion to the offensiveness of the effluvia; and although all accumulations of animal matter should be viewed with suspicion, and removed or obviated, it is singular in how small a degree, unless combined with the produce of living exhalation, or of vegetable matter, they ordinarily prove deleterious.

The air of cities is to a certain extent necessarily contaminated with the products of combustion, and with the effluvia of animal exhalation and decomposition. But the citizen is comparatively exempted from the agency of other noxious qualities of the atmosphere, which in the country go with particular soils and exposures.

To those, however, who have dwelt in a temperate climate, and in a reclaimed soil, the first impression which the notion of a country-residence conveys, is of wholesomeness and salubrity. Who is there, the most habituated to a course of active life and successful occupation in a great city, but recollects having experienced improvement in health and spirits through breathing the air of the country. Even the calm language of philosophy, in describing the advantages of particular localities, conjures up images which recreate and soothe the imagination.

"The goodness of the air," says Lord Bacon, "is better known by experience, than by signs. We hold that air to be best where the country is level and plain, and that layeth open on all sides; so that the soil be dry, and yet not barren or sandy, which puts forth wild thyme, and eyebright, and a kind of marjoram, and here and there stalks of calamint; which is not altogether void of wood, but conveniently set with some trees for shade; where the sweetbrier-rose smelleth something musky and aromatically; if there be rivers, we suppose them rather hurtful than good, unless they be small, and clear, and gravelly."

"It is certain that the morning air is more lively and refreshing than the evening air; though the latter be preferred out of delicacy."

"We conceive, also, that the air stirred with a gentle wind, is more wholesome than the air of a serene and calm sky; but the best is the air blowing from the west in the morning, and from the north in the afternoon."

There are adventitious points which add to the salubrity resulting from a purer air. The wind which blows over the ocean imbibes an infinitely minute portion of the element, and certainly acquires a tonic and strengthening character by this means; nor is it impossible that where chalybeate springs abound, the air partakes of their quality. A locality, again, may be dry or humid; the former from elevation or a porous soil; the latter from being low and surrounded by hills, or from a close and clayey soil preventing the dispersion of the superficial moisture.

Humidity with warmth is relaxing, and detrimental to the weak and the nervous; while humidity joined with cold appears one of the most generally noxious agents that operate on the frame. To avoid damp, to seek an exposure not too bleak, but yet open to a free visitation of air, is the natural rule. But here, as in everything, change is the most important consideration. Even change to an intrinsically less healthy situation may on this principle be beneficial. Perhaps the alternation of town and country, of a residence in the interior, and on the coast, diversify the year most wholesomely.

It is reasonable to conclude that the high lands of the interior, Malvern, for instance, are the wholesomest summer-residence; in the late autumn, when the air loses its freshness, and is tainted with the falling leaf and decaying vegetation, the seaside; in the winter and spring, a town residence, avoiding at once the untempered severity of cold which belongs to our northern and easterly winds in the country, and the malaria arising from our drying fields, threatening the intermittent of the spring.

II. Climates suited to the Strumous Diathesis.

The term climate is used in medicine to designate those habitual conditions of the atmosphere in connexion with the state of the surface, soil, exposure, &c., of particular districts, which are capable of influencing health.

The conditions which render a climate the most suitable to persons in whose constitutions struma lurks or is developed, are freedom from vicissitudes of weather and temperature, and a pure, warm, dry atmosphere. When these are present on the one hand, the lungs (wherein mischief is most to be dreaded) are not irritated; and on the other, the surface of the body (upon the sympathetic influence of which over the rest so much of health depends) is maintained in constant, equable, and healthy action.

The task before me is to point out those situations in our own and in foreign climates, where the advantages described are best attained. With this object, I shall freely avail myself of the observations drawn up for *Forbes's Cyclopædia of Medicine*, (article Climate) by Dr. James Clark, whose knowledge and experience render him our first authority:

English Climates.—The great desideratum in this country is to find a mild climate and sheltered residence for our pulmonary and other delicate invalids during the winter and spring.

Our warmest winter-residences in England are mostly found on the southern and south-western shores; it is their vicinity to the sea which in a great degree renders them warmer than the inland parts in their respective vicinities.

The mild region of England admits of a natural division into four districts, or groups, each having some peculiar features in its climate which characterize it and distinguish it from the others, both as regards its physical and medical qualities. These are—

1. The *south coast*, comprehending the tract of coast between Hastings and Portland Island, including the Isle of Wight; 2. the *south-west*

coast, from the latter point to Cornwall; 3. the district of the *Land's End;* and 4. the *western group*, comprehending the places along the borders of the Bristol Channel and estuary of the Severn.

South Coast.—The superiority of the climate of this district exists chiefly during the months of December, January, and February. In March the temperature of this coast, and that of the interior, (*e. g.* the vicinity of London) is nearly the same. In April and May, the temperature of the interior rises above that of the coast, and continues higher, though in a less ratio, through the summer months. In October the mean temperatures are again equal, and in November that of the coast begins to exceed the interior. The only places on the south coast deserving of particular notice, are, Undercliff in the Isle of Wight, and Hastings and Brighton on the coast of Sussex.

Undercliff is decidedly the most sheltered and warmest of these places, and it has, moreover, this convenience over most of our other winter residences, that it also affords a good summer-climate, a circumstance of considerable importance to many invalids.

Hastings follows Undercliff in point of shelter and warmth during the winter and spring months. Its situation at the base of a range of steep hills, which protect it in a considerable degree from the north and north-east winds, renders it a milder and more sheltered residence during this season than the other parts of the coast of Sussex.

Brighton differs materially in the character of its climate from both these places. It is more exposed to northerly winds, but the atmosphere is drier and more bracing. While inferior to Undercliff and Hastings as a residence in diseases of the respiratory organs, accompanied with much irritation, it offers advantages over both to invalids of a relaxed and nervous habit who are not very excitable. Autumn is the season during which the climate of this place possesses the greatest advantages.

South-west Coast.—The winter climate of the south coast of Devon has long been noted for its mildness. The temperature of its more sheltered spots during the months of November, December, and January (when the difference is greatest), is, on an average, about five degrees higher than that of London during the same period: whereas, on the south coast, the difference scarcely exceeds two degrees. This superiority of temperature over London at both places, occurs chiefly during the night; though the days are proportionally warmer, and the temperature more steady on the south-west than on the south coast. In making this comparison, however, between these two districts, it is right to observe that Undercliff is not taken into the account, for want of sufficient data.

Various places on the coast of Devonshire are held in repute. The principal of these are Torquay, Dawlish, Sidmouth, and Exmouth.

Land's End.—The only place in this district deserving particular notice is Penzance, which has long been frequented by invalids on account of the mildness of its winters. The predominant characters of the climate of the Land's End, and whole south-west coast, are softness and humidity.

West of England.—Clifton has several local advantages, and possesses the best climate in the part of the country where it is situated. Compared with that of the south-west coast, it is more exciting, more bracing, and drier, but not so mild. It is therefore less suited for pulmonary and other diseases, accompanied with much irritation, and with a tendency to inflammation. On the other hand, it is well adapted to invalids of a relaxed, languid habit.

After this survey of the best winter-climates in England, it may be expected that some notice should be taken of our more salubrious summer-residences. On this subject, however, it is not necessary to go into detail, as there is no lack of healthy situations to which our invalids may repair with advantage during this season. In the selection of a summer, as of a winter-residence, the same circumstances require attention, both as regards the character of the climate and the nature of the invalid's disease. The milder and more sheltered situations must be chosen, even during this season, for delicate and very sensitive invalids; while for the relaxed and enervated, and those possessing less sensibility, the bracing air of the higher and drier localities will prove more suitable. To a large class of invalids, our sea-side watering-places offer a variety of excellent situations; and for those cases in which sea-bathing promises benefit, they deserve a preference over the interior, especially during the latter part of the summer and autumn. Several of our inland watering-places, independently of the advantages to be obtained, in many cases, from the use of their mineral-waters, afford good summer-climates; and, indeed, some of them, more on this account than any other, have become places of fashionable resort. Among these we may mention Malvern, Cheltenham, Leamington, Tunbridge Wells, Matlock, Buxton, &c.

The climate of the islands of Guernsey and Jersey requires some notice, as they are occasionally resorted to by invalids from this country. The climate of these islands resembles, in its general characters, that of the coast of Devonshire; it is somewhat warmer, but not more steady, and is more exposed to high winds. Jersey, of the two islands, is in all respects the best suited for invalids. The summer-climate of these islands is delightful.

Foreign Climates.—The climate of the South of France has long been held in repute, but all the southern provinces of that country are far from possessing the same climate; those situated on the eastern frontier being very different in this respect from those on the western.

South-west of France.—Under this division may be comprehended the tract of country which extends from Bourdeaux and Bayonne to Toulouse.

The transition from the climate of the south-western shores of our own island to that of the south-west of France is easy and natural, inasmuch as they exhibit a striking similarity in their general characters. Taking the south-west of France generally, the mean annual temperature is only about 4° higher than that of the south-west of England. Both climates are soft and rather humid, and agree and disagree, generally speaking, with diseases of the same character.

Pau is the only place in this district of France which has a claim to be particularly noticed. This little town, which has been a good deal frequented of late years by invalids from this country, is pleasantly situated at the base of the Pyrenees; and when its close vicinity to that range of lofty mountains is considered, it certainly possesses a far milder winter and spring climate, and is much less subject to high winds and extensive transitions of temperature, than might be expected. One remarkable circumstance in the character of its climate is the mildness of the spring, and its comparative exemption from sharp cold winds during that season. In this respect it bears a very favourable comparison with the climates of the south of Italy. While Pau is 6° colder than Rome during the winter, it is only 2½° colder in the spring. Compared with the warmest parts of England, the same superiority of its spring-climate holds good. Penzance during the winter-months is 3° *higher* than Pau, but 5° *lower* in the spring. This mild character of the spring constitutes the great advantage of the climate. Pau is also very free from fogs, and possesses a dry soil. Its chief fault is the unsteadiness of its temperature. It may, however, be considered, upon the whole, the most favourable residence for invalids in the south-west of France, as far as we have had the means of judging. The difference between the climate of Pau and that of the best situations in England is not great. It is drier and warmer in the spring, and the northerly winds are much less trying to invalids than in this country. One advantage possessed by it is its vicinity to the delightful watering-places among the higher Pyrenees, which offer to the invalid who has passed the winter at Pau a healthy summer-climate without the inconvenience of a long journey.

South-east of France.—Under this division is included that extensive tract of country which stretches along the shores of the Mediterranean, from Montpellier to the banks of the Var, the boundary stream between France and Piedmont. The climate of this district is warmer and drier, but more irritating and exciting than that of the south-west. It is also subject to sudden vicissitudes of temperature, and to frequent harsh cold winds. This great liability to cold piercing winds, more especially the north-west *(mistral)*, which often continues to blow with considerable force for many days together, renders the whole of this country an improper residence for patients suffering under, or peculiarly disposed to, inflammation, or irritation of the respiratory organs. The custom, therefore, which has long prevailed, of sending consumptive patients to the south of France, may be considered a grievous error; an error which the obvious character of the climate, and the result of ample experience of its effects should have long since corrected.

Montpellier.— This place has now so completely lost the character which it once possessed as a mild climate, that a more improper residence could scarcely be selected for a person disposed to pulmonary disease. Its high exposed situation renders it liable to all the evils of this climate in a remarkable degree; and it is, moreover, well ascertained that pulmonary inflammation and phthisis are among the most prevailing diseases of the place.

Marseilles.—Although less exposed than Montpellier, this is an equally improper residence for consumptive invalids.

Hyères possesses the mildest climate in the whole of this district; and this advantage it owes chiefly to its sheltered situation at the base of a range of hills which protect it, in a considerable degree, from northerly winds.

Nice.—This place has long been celebrated for the mildness of its climate, and continues to form the favourite resort of a numerous class of invalids, both from this and other northern countries. Although situated in the same line of coast as Provence, Nice is superior to it in several respects. In the general qualities of its climate it certainly resembles that of the south-east of France; but it has some important local advantages over the best parts of that country. By its steep and lofty range of mountains it is protected from the northerly winds, and especially from the mistral, which we have stated to be so prevalent, and which experience proves to be so injurious to delicate invalids in Provence. This circumstance gives a comparative degree of softness to the climate; but it is still rather exciting. Nice is not exempt from cold winds, especially during the spring; indeed, the prevalence of these constitutes one of the principal objections to the climate of this place in pulmonary diseases generally. For consumption, even in its earlier stages, Nice is an unfavourable situation in a very large proportion of cases. The summer at Nice is too hot for any class of invalids.

Italy.— The climate of the south of Italy differs little in actual temperature from that of Provence and Nice, but it is softer, more humid, and less exciting. On the other hand, the sirocco, which is scarcely felt at the latter places, forms an objection to the Italian climate, though this objection is not of much weight during the winter.

The only places which we consider deserving of notice as winter climates in Italy are, Pisa, Rome, and Naples.

The climates of Pisa and Rome resemble each other in their general qualities. Rome is somewhat warmer in the winter; it is also drier than Pisa, though more humid than Nice and the parching climate of Provence. About one-third more rain falls at Rome than in the latter country, and the number of rainy days is considerably greater. Taking into account all the qualities of the climate of Rome, we consider it one of the best of Italy: to the invalid capable of taking exercise in the open air, it affords advantages over both Naples and Pisa. Patients, on the other hand, who can bear little exposure to the air, and who must, therefore, confine themselves to the most sheltered situations, will find in the Lung'Arno in Pisa, a residence possessing advantages, perhaps, over every other place in Italy.

Naples differs somewhat in the character of its climate from both the last-named places. Independently of the effect which its immediate vicinity to the sea may have in modifying the climate, it is more subject to winds, and the air is more exciting than that of Pisa or Rome. As a residence for invalids labouring under pulmonary irritation, or chronic rheumatism, it is inferior to both; nor are we aware of any cases in which it ought to be considered a more favourable climate. The beauty of the scenery around Naples, however, and the gaiety and excitement of the place and climate altogether, prove very attractive to strangers generally, and render it a very agreeable winter-residence for persons who visit Italy rather as a recreation than for the removal of actual disease.

Madeira.— The minute and careful observations of the late Dr. Heineken, and of Dr. Renton, for a series of years, have afforded us sufficient data to form an accurate estimate of the climate of this island; and although our materials for enabling us to judge of the other Atlantic islands are much less complete, they leave little doubt in our minds that Madeira is superior to any of them, while it affords conveniences in other respects as a residence for invalids possessed by none of them. The height of the central ridge of mountains which compose the greater part of this island, although it may detract somewhat from its warmth during the winter, contributes greatly to temper the heat of its summer. It gives Madeira the advantage of a cool land-breeze during the night, which, alternating with a refreshing sea-breeze in the day, moderates the summer-heat in a very material degree; while the trade-winds which prevail at this season in the latitude of Madeira, contribute also to its coolness and salubrity. The invalid, moreover, by choosing for his summer-residence an elevated situation in the interior, finds a climate considerably cooler than that of Funchal, which is situated on the sea-shore and affords the best winter-residence.

Comparing Madeira with the south-east of France and Italy, we find that, although its mean annual temperature is only about six degrees higher than that of these places, this temperature is very differently distributed throughout the year, the range being far less at Madeira than in the most favoured spots in the south of Europe. Thus, while the winter is twelve degrees warmer than in Italy and France, the summer is five degrees *cooler;* and while the mean annual range at Madeira is only fourteen degrees, it is nearly double this at Pisa, Rome, Naples, and Nice. In the equable distribution of heat thoughout the year, it possesses a similar superiority over the same places; for example, while the mean difference of temperature of successive months at Madeira is only two degrees, at Rome and Nice it is four, and at Pisa and Naples five degrees.

In the progression of temperature during the day, it maintains the same superiority; the mean range for twenty-four hours being ten degrees by the *register* thermometer, while at Nice it is nine degrees, at Rome ten degrees, and at Naples thirteen degrees, by the *common* thermometer. In steadiness of temperature from day to day, (a very important quality in a climate,) Madeira excels all those places greatly. There is also a considerable difference in respect to the dryness of the two climates. Nearly the same quantity of rain falls at Madeira as at Rome; but there are only seventy-three days on which any rain falls, while at Rome there are one hundred and seventeen days. The rain at Madeira also falls at more regular seasons, chiefly in the autumn, the atmosphere being generally dry and clear for the remainder of the year.

The annual range of atmospheric pressure is very small, which is the case also at Rome and Naples.

From this comparison, the superiority of the climate of Madeira over that of the south of Europe will be at once seen.

"When the health of children is naturally delicate, or when it has been rendered so by some of the diseases of childhood, such as measles, hooping-cough, scarlet-fever, &c., no measure with which we are acquainted will prove so effectual in restoring the health as a change to a dry and warm climate."

"Again, about the period of puberty, or a little before this time, a change to a southern climate for one or two winters is a measure which, if judiciously advised and carefully executed, will seldom fail to improve the general health of delicate persons, and favour the full developement of the system which takes place at this period of life; and when there exists a disposition to tubercular disease, it will tend materially to obviate it. We beg, however," continues Dr. Clark, "to observe that we speak of the effects of climate in those cases, not so much as a single remedial measure, as a measure which, while it contributes powerfully of itself to improve the health, favours the operation of a proper regimen, and such other remedies as the circumstances of the particular case may require.

"The third period of human life, in which the powerful influence of a mild climate in ameliorating the health may be remarked, occurs at a more advanced age. The two first occur while the body is yet in progress to maturity, the third when it has passed the zenith of its power. In the first instance, a mild climate enables a delicate frame to attain more certainly its full maturity; in the latter it prevents it from sinking prematurely into decrepitude, and enables it to prolong its existence until the period marked for its natural decay."

"From about the age of fifty to that of sixty, though not unfrequently at a much earlier period, either when the system is naturally weak, or the causes of disease have been powerfully applied, the impaired condition of health now alluded to usually supervenes. This state is marked rather by anomalous disorder of various functions, indicative of a premature decay of the powers of life, than by any formal disease acknowledged in our systems of nosology. The activity of the mind and the bodily vigour have sunk many degrees, without any evident cause, and the individual, both in appearance and feeling, seems rapidly lapsing into premature old age and its accompanying infirmities. This disordered state of the health has been termed the *Climacteric Disease ;* but, as has been already remarked, it occasionally occurs long before the period of life at which this change of the constitution is stated to occur naturally."

"The causes which lead to this condition of the health are various ; as, for instance, an anxious and sedentary life, long-continued and close mental application, or irregular and intemperate habits of living ; and oftener still it is the consequence of the combined influence of several of these causes. From whatever cause it originates, a change for one or two years to a milder climate will prove of the greatest benefit inrestoring the invalid to his wonted health."

III. MALARIA.

"IT has long been familiar to physicians, that there is produced by wet lands, or by marshes and swamps, a poisonous and aëriform substance, the cause not only of ordinary fevers, but of intermittents; and to this unknown agent of disease the term marsh-miasma has been applied. Nor is such knowledge confined to physic. Throughout the world it is a fact known to the vulgar, and even to the less enlightened nations; familiar to the Negroes of Africa, familiar to the lower orders of France, Italy, Holland, and elsewhere, and not less known to at least our own rural population, occupying districts of this character; since every labourer in Lincolnshire or Essex knows that his ague is the produce of his fens. This is the unseen, and still unknown, poison to which Italy applies the term *Malaria*[*].

"The fairest portions of that fair land are a prey to this invisible enemy, its fragrant breezes are poison, the dews of its summer-evenings are death. The banks of its refreshing streams, its rich and flowery meadows, the borders of its glassy lakes, the luxuriant plains of its overflowing agriculture, the valleys, where its aromatic shrubs regale the eye and perfume the air, these are the chosen seats of this plague, the throne of Malaria. Death here walks hand in hand with the resources of life, sparing none: the labourer reaps his harvest but to die, or he wanders amid the luxuriance of vegetation and wealth, the ghost of man, a sufferer from his cradle to his impending grave; aged even in childhood, and laying down in misery that life which was but one disease. He is even driven from some of the richest portions of this fertile, yet unhappy country; and the traveller contemplates, at a distance, deserts, but deserts of vegetable wealth, which man dares not approach, or he dies."

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[*] *Malaria*, by Dr. Macculloch. "We may take the average of life among ourselves, in round numbers, at fifty. In Holland it is twenty-five; the half of human life is cut off at one blow, (and the executioner is Malaria); and there are districts in France where it is but twenty-two, twenty, eighteen."

Such is the picture drawn by Dr. Macculloch of the influence of those noxious exhalations which, under the names of marsh-miasma, or malaria, display their baneful agency from India to the Pole; to which many of the effects habitually assigned to temperature are properly attributable; and which solicit, perhaps, the more consideration, that their cause and nature are still involved in great obscurity.

The effects which are produced by malaria include almost every class of disorder; the intermittent of the spring, the remittent form of autumn, glandular and visceral weakness and disease, sallowness of complexion, hypochondriasis, a worn frame, and early senility, characterize its inroads.

What is the source of the agent which leads to this train of evils?

There is reason to believe that the poison which acts thus fatally on the human frame is the produce of vegetable decomposition. The evidence in support of this opinion is of two kinds. In the first place, it is certain that poisons have been produced (independently of situation) by the effluvia of vegetable matter acted on by water. In the second place, all the instances of local miasma prominently agree in this,—that vegetable matter in different stages of decomposition may be proved, or reasonably presumed, to exist in the soil which has originated them. Of course, these arguments derive their conclusiveness from the proved or supposed insufficiency of animal matter, or of unorganized matter alone, to produce the effects to be accounted for.

One of the most striking instances of the deleterious influence of vegetable matter under decomposition, of frequent occurrence in many parts of Europe, and far from rare in our own country, is found in the process of soaking flax and hemp.

The proofs of the pernicious nature of these operations are numerous and decisive. Of pointed facts beyond number, related both in France and Italy, we find in Sancini, that numerous severe epidemics in the latter country have been traced to these operations, and among the rest a noted one at Ferentino, and another at Orvieto, which lasted many years.

In the former country, out of similarly numerous cases, some intermittents broke out in the plain of Foray, in 1823, after October (a very rare occurrence), and were traced to this cause. And we have the assurance of M. Bourges, that it is invariably pernicious, while he describes one very marked case, where fevers occurred in a dry, sandy, and otherwise healthy and elevated situation, being regularly renewed with the steeping and drying of the hemp, and disappearing when that season was over. In Germany also, where this manufacture is extensively carried on, it seems to have been most satisfactorily proved, that fevers, and of a very bad kind, are the result.

Dr. Rush and other writers give examples of fevers originating from the decomposition of coffee, potatoes, pepper, and other vegetables. Instances of the sickliness of ships from the leakage of sugar in a damp hold; and the particular occurrence of a fever, which committed fearful ravages on the crew of the Pyramus frigate, from the action of bilge-water on chips and shavings left from the repairs of the magazine, (as mentioned by Burnett,) may be adduced to support the same conclusion; nor is the following circumstance without its weight: "In the Campagna of Rome, it is remarked, that if the labourers cut down certain plants (a bushy thistle chiefly) a fever is the consequence. The malaria seems (as it is thought) to be entangled within it, and to be let loose by this disturbance*."

The facts which have been mentioned, go some way to reconcile the understanding to the idea, that illnesses may be produced by the influence of vegetable effluvia. On the other hand, we recollect that every field contains vegetable matter in every degree of decomposition, and in connexion, in succeeding seasons of the year, with every variety of temperature and moisture. Something, therefore, is theoretically wanting to concentrate and give energy to the poison. The little which is yet known of its laws will be best understood from a series of instances exemplifying its influence. They will convey, at the same time, a sufficient lesson as to the practical importance of these inquiries. Fortunately, indeed, the temperature of our own climate, and its generally reclaimed soil, render this subject, relatively, of less moment to us than to the inhabitants of many other countries. Nevertheless, a mitigated malaria exerts its influence among some of the most favoured English scenes.

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* The following instance, communicated to me by the patient, I believe to exemplify the action of vegetable miasma. T. E., aged forty-two, one morning after breakfast, on stooping to open a plate-chest, which had been made of green wood, and kept closed some time, was so powerfully affected by the close smell which issued from it, as to fall backwards, but without losing his senses or striking his head. On recovering, he found he had undergone a paralytic seizure.

"No one fears a summer evening, even a mild summer night, without a dew, yet here often lurks malaria. In a land of meadows, and parks, and ponds, and woods, to take a pleasant walk by the banks of the river or the lake, to watch the trout rise at the evening flies, to saunter among wet grass till the moon rises, listening to the nightingale, is thought to be, and possibly with justness, teeming with the seeds of malaria."

It is believed that the conditions most favourable to the production of malaria are warmth, and the stage of evaporation from the soil which approaches to dryness.

The following examples, however, will best convey to the reader a general notion of what has been ascertained respecting the sources of malaria.

1. *Marshes of Fresh Water* (of which it may be assumed to be the common character, that the land should be partially inundated, that it should be dry in some places and not in others, and that it should be boggy and soft, from the mixture of earth and decayed vegetables,) are the notorious sources of miasm, or malaria.

To take an extreme example, (and one contravening the popular opinion that the rushy pools and petty swamps common on high mountains are innocuous,) Dr. Macculloch mentions that a considerable body of labourers were employed in excavating a pond on a moor of this nature, in Wales, situated a thousand feet above the level of the sea. In the course of the work, within a very short time, nearly one half were incapacitated by the ague.

Or to show the influence of the same cause, by the consequences of removing it, an author, whom I have in another section quoted, remarks, "A gentleman, who died about ten years ago, at an advanced period of life, told me, that six miles west from Edinburgh, the country was so unhealthy in his youth, that every spring the farmers and their servants were seized with fever and ague, and required regularly to undergo bleeding and a course of medicine, to prevent attacks, or restore them from their effects. At the time these visitations were believed to be necessary and unavoidable; after, however, said my informant, an improved system of agriculture and draining was established, and vast pools of stagnant water, formerly left between the ridges of the fields, were removed, dunghills carried to a distance from the houses, and the houses themselves made more spacious and commodious, every symptom of ague and marsh-miasma disappeared from the district, and it became highly salubrious."

There was a pond at Woolwich occupying an old gravel-pit on the common, close to a house belonging to the late Dr. Hutton, and occupied by General Stehelin, its whole extent being but a few square yards. It was remarked, for a long course of years, that the inhabitants of this house suffered under perpetual agues: and it was not until this pond was destroyed by the alteration of the common, that the disease disappeared.

A gentleman purchased an estate in the northern part of New York, in a remarkably healthy region, for the sole purpose of spending his summer in a salubrious and delightful spot. Occasionally, some one or more of his family were visited with protracted fevers, while the whole country round continued healthy, for which no satisfactory reason could be assigned. This gentleman was an acute observer, and at length made the discovery that after the wind had blown some time from the same quarter, some member of his family was sure to suffer. Pursuing his investigations, he discovered, at no great distance from his house, in a sort of hollow or basin, formed by hills on three sides, a body of stagnant water, in a most offensive state. The side of the valley or basin next the house was open, there being an eminence barely sufficient to keep the water confined; thus the wind, in passing through this funnel-formed reservoir, became loaded with poisonous effluvia, which produced its usual effects on those exposed to its influence. After a trifling expense of draining, no other case of the same disease occurred.

Ditches and drains are equivalent to marshes.

The soil of Walcheren is a mixture of clay and sand: and it appears to be from the drains chiefly, a few pools being also present, that its most pestiferous air is produced. The soil of the Campagna of Rome is a dry soil, and the malaria seems to be produced by the drains. This principle furnishes a channel through which the origin of malaria is directly introduced into cities, towns, and houses.

In houses, it is evident that every form of miasm, from vegetable decomposition, to animal exhalation and contagion, is liable to be accumulated: and these combinations have given rise to the destructive fevers, by which the districts of cities, in which cleanliness and ventilation have been disregarded, have been frequently ravaged. But the most striking instances are those where poison lurks in a single house, or in a single corner, through the want of dissipating ventilation alone. The following anecdote is from Dr. Hennen's "Military Surgery."

"After some days spent in marching, I got into a house, and fixed my bed in a room with thirteen other officers, where we were properly secured from the inclemency of the weather. My berth was considered as particularly enviable, being a very dry, sheltered corner; I still used my blanket sack, but the violence of the rains prevented the possibility of exposing it to the air. On the third day I was attacked with irregular chills and febrile heat, and before the tenth, my life was in danger from a combination of typhus and dysentery, and nothing but immediate removal to London preserved it. Three persons who, in succession, used my blanket, and got into a *snug corner*, were attacked in the same manner, while all those who slept under the windows, or in the more exposed parts of the building, escaped the febrile affection."

2. The influence of *Salt-water Marshes* is exemplified by those of Normandy, of the French shores of the Mediterranean, of both shores of the Adriatic, &c. It has again frequently been remarked in Holland that the severest seasons of fevers have followed casual irruptions of the sea, and also that, on these occasions, there has been produced a degree of putrefaction, attended with an insufferable smell, unusual in other cases. In England, there are few tracts more productive of malaria, which is even of a virulent nature, than Herne Bay, and the river-banks in general about Reculver, where the water is salt, and the whole is covered twice a day.

3. The power of woods in generating malaria, is not less notorious than that of marshes, at least in the tropical climates. The jungles and the jungle-fevers of India are as familiar, even to the multitude, as the ditches and fever of Walcheren. The jungle, it must, however, be remarked, is a low and dense brushwood, or a thicket of reeds and grass; and it is often consequently, as the residence

of moisture and decaying vegetation, analogous to a marsh. Yet the production of fever does not seem limited to this particular species of woods in India; since, according to the testimony of Buchanan, confirmed by that of others in several parts of the East, fevers are produced among the opener and larger forests, in Mysore and elsewhere, and are, in fact, the usual concomitants of all woods. To bring this home to our own country,—if any one will examine the districts of Sussex and Kent, which produce endemic fevers, of Hampshire and Essex, (occurring in the latter in the centre and on the borders of Epping Forest, the ground high, the soil in some parts gravelly,) he will find reason for believing that close and wet woods are, in this climate, a source of malaria.

4. Dr. Rush observed that, in Pennsylvania, epidemics invariably follow the clearing and cultivation of forest-land, and that they do not disappear till after many years of continued agriculture. The same remark has been made in France; and the district of Bressi (Lyonnaise), which was comparatively healthy when full of woods, has been nearly depopulated since they have been cut down. Reversely it follows, that the planting of trees will sometimes check the production of malaria, by protecting wet lands from the action of the sun, as well as by absorbing and dissipating the moisture.

5. Lands subjected to drainage (sometimes even for the very purpose of subduing or exterminating malaria) have become even more noxious than before. Upon draining the marsh of the Chartreux, near Bordeaux, a succession of bad fevers, before unknown, commenced immediately upon the drainage, showing themselves first in that part of the town which lay nearest to the land reformed, and lasting through many years; proving so severe in 1805, that twelve thousand people were affected, out of whom three thousand died in five months.

The simple effect of disturbing the soil, and so laying bare fresh surfaces to evaporation, was remarked upon by M. de Prony, in the course of a series of operations conducted by him, under the orders of the French government, in the Pontine Marshes. The history of this district conveys instructive physical lessons.

"The present insalubrity of this territory is so dreadful, that for a space of fifteen leagues in length by five in breadth, there is not a single town, a bourg, or even a village. This vast plain of the Pontine Marshes was, however, one of the principal elements of the power of the Volscians, who must have had a very numerous population to afford the destruction caused by their combats with the Romans. That population, however, found abundant means of subsistence in the culture of an eminently fertile plain, a cultivation which produced all that is grown in the savannahs of the New World, and which seasoned the land, and rendered it habitable. When Rome triumphed over the Volscians, that is to say, when the latter were for the greater part exterminated, the vast efforts and continual care which the cultivation of the Pontine Marshes required, and the draining off the waters having entirely ceased, nature. resumed there her former insalubrity, and the Pontine Marshes were no longer habitable.

"When the censor Appius set about constructing a public road from Rome to Terracina, he opened it in a straight line from the environs of Alba to the latter town, crossing the marshes through their whole length. It is one of the greatest undertakings of the kind executed by the Romans. The solidity and the extent of the work are equally worthy of attention; and this road, which is now continued from Terracina to Brundusium, is still, after twenty-three centuries, one of the most remarkable monuments of the Roman power.

"The soil on which this road was constructed had so little consistence, that it sunk four feet under the mere pressure of the materials of the road. The road was formed upon a foundation of turf, which could be excavated without disengaging the putrid miasmata, and the deleterious gases. Such is the statement upon this subject of a skilful Italian engineer (M. Scaccia), who, by order of the

French administration, was commissioned to make a cut to the Appian Way, for the purpose of constructing a bridge.

"This cut, before the whole of the bridge was erected, became a centre of emanation for the foul air, and great numbers of the workmen fell ill, three of whom, from Terracina, died. The chief workman, who directed the building of the piers, and who had never been ill at Terracina, where he was employed the whole year, was seized with an atonic malady, from which he had not recovered upwards of two years afterwards. M. de Prony was himself twice attacked by the fever in 1822, through remaining two or three hours upon the ground. The concentration of the foul air which took place in this soil could not, as it appeared, be produced, except by the exhalations from the turf placed in contact with the surrounding air, already filled with exhalation, the abundance of which was indicated by the diminution of volume in the dried turf."

A principal difficulty in the theory of malaria, arises from the capriciousness of its influence in respect to distance from the point where it is generated. As a general law, malaria is more pernicious in proportion to the proximity to its source. In some instances, however, it is found to affect places at some distance, especially if they are situated on an eminence, with the same, if not with greater, intensity, than those in the vicinity; thus the neighbourhood of Versailles is powerfully influenced by the marshes of St. Cyr; and at Neuville-des-Dames, above Chatillon on the Indre, fevers are more prevalent than close to the marshes where the malaria is produced.

The most extraordinary instance of the kind known, is mentioned by Dr. Macculloch to occur in Malta;—the malaria, which is originated on the beach below a cliff, produces no effect on the spot itself, while it affects, even to occasional abandonment, the village situated above.

The distance to which marshy emanations may extend by gradual diffusion has been calculated by Monfalcon to be 1400 or 1600 English feet of elevation, and from 600 to 1000 feet in a horizontal direction. In Europe, these limits, he supposes, cannot be exceeded; but in equatorial regions, the activity of the poison is much more extended; and in the West Indies, vessels at the distance of 9000 feet from the marshy coast have felt their baneful effects.

The diffusion of malaria is assisted by damp and fog; and hence, the evening and the night and the early morning are the seasons, when its influence is most sensible upon human beings that pass within its reach.

IV. CLIMATE OF THE FACTORIES.

IN illustrating, at the commencement of the present volume, the conditions upon which the maintenance of animal power depends, I took occasion to introduce Dr. Arnott's graphic account of the gigantic capabilities of the steam-engine, which, with some happiness of fancy, he compares to the agency of the genii of eastern fable.

The parallel admits of being extended. Those superhuman powers were both beneficent and malevolent; they were endued with opposite instincts, some delighting to promote virtue and happiness, others to crush our race, and foster its tendencies to ill. Of which nature is the genius of the factories?

Is the steam-engine (as Mr. Rickards, the government inspector, speaking, however, of its agency in the hands of an interested or avaricious master, represents it,) "a relentless power, to which young and old are equally compelled to submit," "a tyrant power, which (if not duly restrained) may at any time and without an effort, cripple and destroy thousands of human beings?" Is the air in which it exerts its baleful agency heavy with suffocating particles, its temperature heated and relaxing, its soil and dwellings foul and wretched, its climate withering, its victims the immature youth, its moral law the extinction of domestic ties, and the inversion or violation of social duties? Or are these appalling images shadows of the night: and is the following the true picture of an Arcadia of the factories?

"In my recent tour, I have seen tens of thousands of old, young, and middle-aged, of both sexes, many of them too feeble to get their daily bread by any former modes of industry, earning abundant food, raiment, and domestic accommodation, without perspiring at a single pore, screened meanwhile from the summer's sun, and the winter's frost, in apartments more airy and salubrious than those of the metropolis in which our legislative and fashionable aristocracies assemble. In those spacious halls the benignant power of steam summons around him his myriads of willing menials, and assigns to each the regulated task, substituting for painful muscular efforts on their part the energies of his own gigantic arm, and demanding in return only attention and dexterity to correct such little aberrations as casually occur in his workmanship. The gentle docility of this moving force qualifies it for impelling the tiny bobbins of the lace-machine with a speed inimitable by the most dexterous hands directed by the quickest eyes. Hence, under its auspices, and in obedience to Arkwright's policy, magnificent edifices, surpassing far in number, value, usefulness, and ingenuity of construction, the boasted monuments of Asiatic, Egyptian, and Roman despotism, have, within the short period of fifty years, risen up in this kingdom, to show to what extent capital, industry, and science, may augment the resources of a state, while they ameliorate the condition of its citizens. Such is the factory system, replete with prodigies in mechanics and political economy, which promises in its future growth to become the great minister of civilization to the terraqueous globe*.' "

I am afraid that a candid examination of the evidence which has been accumulated on the factory system, compels us to believe, that the views of Dr. Ure rest on partial facts, and bear little resemblance to the general condition of the population which he describes to be thus happy and prosperous.

A gentleman, on whose testimony I the more readily rely, that I know his leaning to be towards the factory system, described to me that a temporary residence in Manchester oppressed his spirits; the mass of squalid poverty and misery which he witnessed filled him with melancholy.

The opinion of Mr. Thackrah, of Leeds, a man accustomed to compare and estimate the appearances of operatives, corroborates that of my friend, who was a casual visiter. "I stood in Oxford Road, Manchester, and observed the stream of operatives, as they left the mills at twelve o'clock. The children were almost universally ill-looking, small, sickly, barefoot, and ill-clad. Many *ap-*

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* Dr. Ure's *Philosophy of Manufactures*, pp. 17, 18.

peared to be no older than seven. The men generally from sixteen to twenty-four, and none aged, were almost as pallid and thin as the children. The women were the most respectable in appearance; but I saw no fresh fine-looking individuals amongst them. * * * * Here I saw, or I thought I saw, a degenerate race—human beings stunted, enfeebled, and depraved."

"The following Table, arranged by the Committee of Classification appointed by the special Board of Health, from the reports of inspectors of the various district boards of Manchester, shows the extent to which the imperfect state of the streets of Manchester may tend to promote disease among the poor:—

Number of District.	Number of Streets inspected.	Number of Streets unpaved.	Number of Streets partially paved.	Number of Streets ill ventilated.	Number of Streets containing heaps of refuse, &c.
1	114	63	13	7	64
2	180	93	7	23	92
3	49	2	2	12	28
4	66	37	10	12	52
5	30	2	5	5	12
6	2	1	0	1	2
7	53	13	5	12	17
8	16	2	1	2	7
9	48	0	0	9	20
10	29	19	0	10	23
11	—	—	—	—	—
12	12	0	0	1	4
13	55	3	9	10	23
14	33	13	0	8	8
Total...	687	248	53	112	352*

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* Wing's *Evils of the Factory System*, p. lxxxiii.

"A minute inspection of this table will render the extent of the evil affecting the poor more apparent. Those districts which are almost exclusively inhabited by the labouring population, are Nos. 1, 2, 3, 4, and 10. Nos. 13 and 14, and 7, also contain, besides the dwellings of the operatives, those of shopkeepers and tradesmen, and are traversed by many of the principal thoroughfares. No. 11 was not inspected, and Nos. 5, 6, 8, and 9, are the central districts, containing the chief streets, the most respectable shops, the dwellings of the more wealthy inhnbitants, and the warehouses of merchants and manufactures. Subtracting, therefore, from the various totals, those items in the reports which concern these divisions only, we discover in those districts which contain a large portion of poor,—namely, in Nos. 1, 2, 3, 4, 7, 10, 13, and 14,—that among 579 streets inspected, 243 were altogether unpaved, forty-six partially paved, ninety-three ill ventilated, and 307 contained heaps of refuse, deep ruts, stagnant pools, ordure, &c.; and in the districts which are almost exclusively inhabited by the poor,—namely, Nos. 1, 2, 3, 4, and 10,—among 438 streets inspected, 214 were altogether unpaved, thirty-two partially paved, sixty-three ill ventilated, and 259 contained heaps of refuse, deep ruts, stagnant pools, ordure, &c."

I shall now adduce in evidence some of Mr.

Wing's personal observations on the state of the manufacturing population :—

"Having provided myself with a thermometer," says Mr. Wing, "I visited ——, a coarse mill, and found the operatives, both adults, and children of thirteen, worked the twelve hours, exclusive of meal-times,—that is to say, from six o'clock in the morning to half-past seven at night, with half an hour for breakfast at eight, and one hour for dinner at twelve; about four another meal is taken, without stopping the machine; a copper of hot water on the outside supplied the power of having tea and coffee, which the operatives thus obtain; the different parties, as they come, unfold a paper containing tea or coffee, with a little sugar; the contents are placed in their pitchers, the water is poured upon the ingredients, they quickly depart to their different operations, and can scarcely be said to rest at this period of refreshment. In the card-room, a boy, who was in-kneed, sickly-looking, short, and of spare muscular developement, and apparently about twelve, I found, to my astonishment, was seventeen years old. 'Had worked five or six years in a mill. On a Monday morning was so stiff could hardly move, and at night was sadly tired; his limbs were straight when he entered the mill.' This unfortunate boy was doomed to work the full time. The temperature of this room was sixty-seven. A boy belonging to this mill having told me he was thirteen, upon being closely interrogated, said, that he should be of that age the next month; he worked the full time: my belief is, he was barely twelve. In the dressing-room of this mill there were nine adults, who looked of a factory cast. The temperature was ninety-eight degrees, and the overseer said, that when the gas was up, the increase of heat would be to 103 or to 105 degrees. The work necessarily required a high temperature. The general appearance of this mill was not favourable. The overseer, however, appeared to be a man of humane disposition.

"A girl, belonging to ——— mill, told me she was not nine. She was working eight hours.

"In ——— mill, twelve adult women were in the batting and picking room, which was dusty and unhealthy. I was informed that these operatives were rather disorderly, and fond of ardent spirits. The temperature was eighty-four, the gas being lighted at the time I was in the room. One person had worked in this mill thirty-five years; I did not meet with many such instances.

"I perceived a girl with others coming out of a large mill, whose young and delicate appearance particularly struck me. Upon asking her age, she said she was thirteen. Not crediting her statement, I asked the age of her next sister, if she had one. A child standing next to her said, that she was her sister, and I learned that her own age would be 'fourteen in February;' they both worked full time.

"This was a cotton and weaving mill, which I had not an opportunity of seeing internally. I was near when the children left it at twelve o'clock. The general character of this mill was, I understood, good; but the children looked ill, and several were lame. This lameness appeared to proceed from the flat state of the feet, in consequence of the plantar arch having been weakened."

"In one mill which I visited, there were about forty operatives in the card-room, which was very dusty, and oppressive to respiration. I found the effluvia particularly offensive. To describe the effluvia in some of the rooms is difficult, partaking, as it does, of the combined qualities of the friction of the machinery and of oil; the effect is of a faint and sickly nature. I had an opportunity of seeing spinal deformity, and, upon making the relative inquiry, I found that it was induced by the system, and I saw wounds caused by the machinery."

Mr. Gaskell, in his interesting volume entitled "Artisans and Machinery," gives the following painful picture of another feature in the system.

"The system of factory-labour has gone far towards annihilating the great and beautiful principle in woman's moral organization. The substitution of female labour for that of the adult male, has driven her to the mills, in which she is confined the whole day: this has torn asunder those links of affection which, under almost all other circumstances, have bound a mother to her offspring; and doing so, it has deprived her of that characteristic which is the most influential in rendering her a loveable and loving being.

"Compelled to rise early—no opportunity given for visiting home, during the day, but at the hurried meal-times—her social affections warped, her frame little calculated to furnish her child with support, she becomes inaccessible to its appeals to her tenderness—leaves it to the care of a hireling, or young person, often a mere infant—suffers it to be filthy and half-starved; and, as faculties develop, takes no interest in keeping it from the contagion of vice and grossness."

"In consequence," says Mr. Greg, "of the mothers being employed from home, their children are intrusted, in a vast majority of cases, to the care of others, often of elderly females, who have no infant family of their own; and most of whom, having in their youth had their children nursed by others, have never formed those habits of attachment and assiduous attention to their offspring, which could alone afford a probability of a proper care of the children committed to their charge. These women often undertake the care of several infants at the same time; their habits are generally indolent and gossiping; the children are restless and irritable, from being deprived of a supply of their natural food (as, when the mothers suckle them, they can only perform that duty in the intervals of labour); and the almost universal practice among them is, to still the cries of the infant by administering opiates, which are sold for this purpose under several well-known and popular forms. *The quantity of opium* which, from habit, *some children become capable of taking, is almost incredible;* and the effects are correspondingly destructive. Even when the infants have a healthy appearance at birth, they almost uniformly become, in a few months, puny and sickly in their aspect, and a very large proportion fall victims to bronchitis, hydrocephalus, and other diseases, produced by want of care, and the pernicious habits we have detailed. We must mention also, that spirits, *particularly gin*, are frequently given when the infants appear to suffer from pain in the bowels, which, from injudicious diet, is very common amongst them."

One other feature I will only add, leaving the rest to be conjectured by the reader, whose imagination, however, will hardly paint an extent of vice and misery equal to that demonstrated by the evidence laid before Parliament.

"The little regard paid to religion by the mass of the manufacturing population in towns, is a painful circumstance connected with their condition, as it has been truly said, by Dr. Chalmers, that the masses of mill artisans live in practical heathenism. A disregard for the common observances of religious worship, and the spending the Sabbath in drunkenness, is almost universal in the lowest classes. The proportion of these degraded beings, who possess no knowledge whatever of the most simple portions of Christian faith, is truly astonishing. The Report of the Ministry to the Poor in Manchester, says:—'The wide open fields at the outskirts of the town, and places in town less frequented by the walks of man, are, on the Lord's day, occupied by herds of boys and young men, and even by men more advanced in life, gaming. The dram-shops, Tom and Jerry shops, swarm the Lord's day over (except for an hour or two in service-time), and overflow at night. * * * Very many of the people whom I visit believe that they have no power to do the will of God,—that they must wait until they have received assistance from the Spirit of God,—until God enables them, and makes them willing to repent. They believe their children equally powerless to do good. This belief, and the habits which it has produced, makes them neglect the moral culture of themselves and children.'—P. 16. Dr. Kay, who was connected professionally with several charitable institutions, which led him into the homes of these people, says, that the men spend the Sabbath-day in idle and drunken negligence; and our own observations, continued for many years, have abundantly satisfied us, that religion is little cared for, and its forms, in a great measure, unattended to."

The brief examples which I have selected, constitute a picture which cannot be contemplated without pain and sorrow. However coloured the evidence may often have been, by an imagination enlisted in behalf of the sufferers, it is impossible to doubt, that the prevailing condition of the manufacturing labourer is one of corroding trial and hardship,—of health impaired,—of duties unpractised and unknown,—of reckless selfishness and vice,—the labourer prematurely old, yet, earlier still excluded from the factory,—that a child (a less costly and more pliant servant) may take his place, the new and docile victim of the same destroying power.

The scene is one from which the most callous heart cannot turn with indifference. For these complicated ills is there no relief? is the prospect clothed in thick and utter darkness? Does no cheering light, however distant and dim, penetrate the gloom?

We raise our thoughts to that great Being, whose attributes are mercy and beneficence;—can this be the irrevocable earthly doom of one class of His creatures? when such infinite blessings, such capacity of moral worth, enjoyment, happiness, are partially yet profusely scattered through the world, can the Author of Nature intend this perpetuated misery? Some exit there must surely be from this dark path, some turning in this crowded lane of human wretchedness.

That, under which so large a section of civilized humanity is prostrate, is the result of infinite thought, industry, skill; the mastery of mind over the physical elements of Nature, that wields her powers with a force of productiveness and increase of national wealth, that no philosophic dreamer anticipated. Is national suffering and degradation to increase in the same ratio,—is that power which knowledge gives,—like other power,—in proportion to its greatness, to promote vice and misery? Is this the decree of Nature? Does this tree likewise bear death? One cannot relinquish the contrary belief.

The ways of Heaven who may venture to scrutinize? yet, in the accumulating misery which endangers a nation's prosperity, while it springs from the unhallowed means that have increased it, there is a lesson to humble human pride,—and to call all thoughts away from selfish aims and enjoyments, towards the discharge of those great social duties, which, imperative on all, are most imperative on the highest in rank and power.

The main hope of amelioration for the condition of the labourer of the factory, is in the interference of the Legislature, to organize a system of public education, and effectually to limit the hours of labour. The steam-engine never tires, nor the restless anxiety to accumulate wealth. The same energy which abolished colonial slavery against the interests of one class of proprietors, must be exerted to mitigate more pressing evils of humanity at home,—to complete the work which, commenced by the late Sir Robert Peel, has been honourably advocated by Sir John Hobhouse, Mr. Sadler, Lord Ashley.

But science (of which who may conjecture the ultimate results?) has already done something to repair her own wrong. The improvements in manufactories have already removed much that was physically prejudicial to the labourer.

"Although the hours of labour have not undergone any very material alteration since the universal application of steam, and since the doing away with night-labour as a general custom, the condition of the factory-children has undergone great amelioration, from the improvement in the construction of the mills. Subsequent to 1806, when the steam-loom was first brought into operation, many of the first mills were either much enlarged, or in very numerous examples abandoned by the more wealthy manufacturers, and in their stead, large buildings were erected, fitted to receive, in addition to the spinning processes, a quantity of looms.

"Nor was this increase in size the only advantage. The rooms were much more lofty, generally of large proportions, had numerous windows, so arranged as to afford excellent ventilation, whilst improved modes of warming them have done away with many of the inconveniences which had hitherto attended upon this necessary portion of their interior economy. This consists in carrying through the room pipes conveying steam, or heated air, which enabled the overlooker to regulate the temperature according to the necessity of the season. Various improvements have taken place in the cleaning the cotton, so as to free the mill from a great part of the flue, or fine cottony down, which in the old mills spinning coarse numbers had been nearly suffocating. Cleanliness has been cultivated, which the use of cast-iron floors, and the gradual substitution of iron in the frame-work of the machinery, has rendered perfectly attainable."

And least should be undervalued the influence of those examples, which many of the masters of manufactories have given, whose right hearts and enlarged understandings have taught them that to study and promote the comfort and happiness of their labourers would not fail to carry with it increase of prosperity. Mr. Gaskell, whom I have frequently quoted, and who may be admitted the more readily as evidence on this occasion, as the bias of his opinion is against the existence of good in the factory system, observes, " It would be equally unjust to take, as the sole ground for examination, the establishment of the Messrs. Strutt, in the valley of the Derwent, or any other country mill, conducted by men of enlarged benevolence and active philanthropy. Nothing indeed can be *more cheering to the eye*, or *gladdening to the heart*, than the admirable organization of a few out-town manufactories; and if an opinion were to be formed from these, we should at once assent to that of Dr. Ure; namely, that factory labour is the best which can be found for the operative. But the instances adduced are rather *beautiful examples of what may be done*, than illustrations of what is done. Why is it that, as at Belper, Quarry-bank, Ramsbottom, and other places, order, sobriety, and morality characterize the labourers? *Because they form, as it were, one great family, bound together by common ties!*"

The poor do not covet the position of the wealthy. They recognise, without murmuring, Nature's decree of inequality of condition; they look only, and they have a right to look, for sympathy with, and considerate thought for their wants, on the part of those, who are now at the top of Fortune's wheel.

CHAPTER VII.

OF HEALTH OF MIND.

"GREAT joys attenuate and diffuse the spirits and shorten life; familiar cheerfulness strengthens the spirits by calling them forth, and yet not resolving them.

"Impressions of joy in the sense are nought; ruminations of joy in the memory, or apprehensions of them in hope, or fancy, are good.

"Joy suppressed, or communicated sparingly, doth more comfort the spirits than joy poured forth and published.

"Grief and sadness, if it be void of fear, and afflict not too much, doth rather prolong life."

The preceding aphorisms are taken at random from the maxims laid down by Lord Bacon for the government of the mind, in reference to health and longevity. Of such rules the common principle is to use the powers of the understanding, but not without intervals of leisure; to shun great elevation or depression of the spirits; to cultivate evenness of disposition. A wonderful thing it is, that Nature has in this respect given the body advantage over the mind. The rules which draw out all the resources of the bodily frame, which give sound sleep, good digestion, strength of bone and sinew, tend, likewise, to the preservation of health and to the protraction of life. It is not so with the mind. It is certain, that if health and long life were the only considerations, the mind should not be raised to its full power of exertion, or all its energies called out and strenuously employed. For health and long life, there is no doubt that an indifference to great objects, and a succession of light and frivolous pursuits, a heart gradually toned down to insensibility to moral obligations and religious duties, would (strange enough) be no unfitting means. Nor are there wanting instances in society to prove the fact. "Even so (if the citation is allowable) are the children of this world wiser in their generation than the children of light."

An especial resource for minds of this order are games of cards, which tend in a remarkable degree to promote the qualities of heart and understanding to which I have adverted. An element in all games of cards, again, is cupidity; than which, if it does not prey too much upon the thoughts, nothing is more conducive to life, by furnishing a perpetual object of hope and of worldly satisfaction. It is certain, however jarring the idea, that no one bids fairer for a long life than the cool and practised gamester; his diet light,—chicken and lemonade,—every heat and disturbance of head or heart carefully suppressed or excluded, and the habitual game presenting the amusement of vicissitude, with a current still in his favour. The wholesomeness of the occupation does not, however, extend to all the species under the genus; a rook is a hardy and long-lived bird, a pigeon less so; although the latter is often but the larva of the former.

Games of cards, however, are not censurable, when used as an occasional means of relaxation to minds habitually bent upon other objects; taken thus, to those who like it, a game at whist serves to tranquillize or to divert busy thoughts.

A trivial succession of pursuits of mere amusement (the only possible excuse for which is, that they conduce to general health) has sometimes to be recommended for *health of mind.* Where insanity has occurred, or where the inherited disposition is strong, it is the duty of a wise physician to prescribe occupations which else would be frivolous,—light amusement, for instance, such as travelling, with no object but change of scene. Nor is it the least grievous element of that dreadful malady, that in those disposed to it the mind requires to be denied all strong and manly exercise, and has to be carefully led away from serious thoughts. It is said that cards were invented for the amusement of a deranged king.

The game of chess has a wholesomer character. It is certainly not made for the viciously idle; but, like angling, is for the recreation of indifferently good people.

The game of chess is a singular anomaly in the history of intellect. Of Indian extraction, it is like their carved spheres of ivory,—art, as exquisite, and as useless.

Mr. Lewis, the most philosophic chess-player of any time, and whose works present the clearest and most profound analysis of the game yet given, assures me (at which conclusion, however, I had before arrived, from observation of different players) that the talent for playing chess bears no relation to the general talent of the player. It may therefore be compared to musical or arithmetical genius. A great chess-player, however, like one possessed of any other partial talent, cannot be a person of an understanding generally inferior. Every one, Mr. Lewis thinks, has an individual maximum of talent for chess, to which, by study and practice, he may be brought, but beyond which he cannot pass. It is very singular that Nature should have given an arbitrary measure of talent, incommensurate with general ability, and sometimes so powerful as to amount to genius, for a thing so vain.

For more important objects, the powers of the mind have, no doubt, the same natural limitations; only that for these there is no measure by which the force of different individuals can be compared, no mental dynamometer, as at chess.

Any one who believes in the above proposition in regard to chess, may make the game an agreeable relaxation. When beaten, his *amour propre* may be saved by the reflection that he is perhaps inferior at chess only. He may thus breathe his mind at chess as he might his body at fencing, without incurring the risk of any painful humiliation.

There are two important lessons to be learned at chess.

The first is *the value of acquired knowledge.* A person who has studied the game of chess and knows it, will beat with ease and certainty one of much more talent for the game, who understands its general principles only.

The second is, encouragement *never to give up a losing game*, but still to struggle on for success, playing only with increased caution and thought, as the difficulties muster around you. In life, as at chess, no one can anticipate the remote consequences of every position, and the skilful management of disastrous circumstances may be the road to prosperity.

Such, more or less justly delineated, is the value of one class of amusements. Let me now, still pursuing the same object, try another cast.

There exists in well selected imaginative literature a source, by which the mind is raised to contemplate lessons of excellence in human nature and conduct; in which moral worth is made the theme of interesting narrative; in which virtue is presented in its brightest and most attractive colours. Let us look at the mental influence of the fairest lessons of romance.

There are persons so happily gifted in mind and health, that their spirits keep an equal and uninterrupted course, never rising to excess, never sinking to depression; whose thoughts and dispositions are so truly balanced, through the concurrence of good natural tendencies with fortunate associations in early youth, that in their path through life they shun, as from a necessity, all that is unbecoming, and keep, without an effort, the even tenor of their way, secure from within, assailable only by the accidents of Nature. The prosperity of those who form this rare and gifted class, as it is viewed without envy, for their inherent superiority is allowed, so does it give a useful tone to the aspirations of commoner natures, rendering some approach to excellence easier, by displaying at once its attainment and its reward. But not less useful is the lesson, when the same temper and frame of mind are viewed under adversity and disappointment, bearing up with equanimity against the reverses of our lot, and submitting with dignity to sacrifices of leisure, habit, ease; toiling with serenity, where less perfect minds are broken with peevishness and discontent; suppressing each temptation to seek by a less lofty path shelter and a haven; sustaining that tone of temper, feeling, judgment, which else might have been thought the favoured offspring of prosperity. In both of these aspects, and equally admirable in both, the character shone of a great departed genius, whose life presented, both in fortunate and adverse circumstances, an admirable and rare alliance of the greatest intellectual gifts with the highest tone of moral and social worth.

Thus *he* lived, whom I have been carried away to cite as a noble actor in the scene of human life, when his writings alone are my present lawful theme. With an imagination rivalling that of Shakspeare in fertility, he has peopled our recollections with shadows of human nature, in which, with more than historic truth, its springs of action are unveiled, what is worthy in it displayed, and held up for imitation by the instinctive bent of the poet's mind. Second, perhaps, to our great dramatist in profound analysis of the human heart, and less powerful in portraying its sterner energies, where the flight of his various invention soars the highest, than in representing the softer grandeur and sublimity of which it is susceptible, as elsewhere its pathos and its humour,—the Raffaelle at once and Wilkie of his art, as Fielding was the Hogarth, and Shakspeare the Michael Angelo of an higher,—his uniform and almost unconscious design appears to have been to impart to all his works a moral bias; when his conceptions are the loftiest, such is their tone*.

The uniform characteristic of the novels of Sir Walter Scott is the moral wholesomeness which pervades them. The sympathies of his readers are always enlisted on the side of Nature, correct feeling, and true principle. No false or affected sensibility, no anatomy of vice, nothing to lower the moral standard of humanity, deforms his pages.

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* Let me give one striking instance in which the value of mental discipline and self-correction, and the serenity of mind, *with length of days*, resulting from these efforts, are contrasted by Scott with the sunniest light of earthly happiness, in lessons of such truth and force, that the latter is pale and ineffectual in the comparison. I advert to the exquisite characters of Minna and Brenda in *The Pirate*, in which Brenda is the object of every blessing of fortune, and has every-day felicity. "But Minna,—the high-minded and imaginative Minna,—she, gifted with such depth of feeling and enthusiasm, yet doomed to see both blighted in early youth, because, with the inexperience of a disposition equally romantic and ignorant, she had built the fabric of her happiness on a quicksand instead of a rock,—was she, could she be happy? Reader, she was happy; for whatever may be alleged to the contrary by the sceptic and the scorner, to each duty performed there is assigned a degree of mental peace, and high consciousness of honourable exertion, corresponding to the difficulty of the task accomplished. That rest of the body which succeeds to hard and industrious toil, is not to be compared to the repose which the spirit enjoys under similar circumstances. * * * * * * Her thoughts, however, were detached from the world, and only visited it with an interest like that which guardian angels take for their charge, on behalf of those friends with whom she lived in love, or of the poor whom she could serve and comfort. Thus passed her life, enjoying from all who approached her an affection enhanced by reverence, insomuch that when her friends sorrowed for her death, *which arrived at a late period of her existence*, they were comforted by the fond reflection that the humanity which she then laid down was the only circumstance which had placed her, in the words of Scripture, 'a little lower than the angels!'"

Yet is such reading dangerous, when, instead of being adopted as an occasional relaxation, use has made it a necessary resource.

It wastes feeling, it detaches the aspirations from reality, and uses that mental warmth which is wanted for the vigorous conduct of the business of life. The inhabitants of the Peninsula are constitutionally romantic; their torrid imaginations do not link with the course of sober exertion. "Every man in Portugal," the Duke of Wellington wrote in one of his despatches in 1810, "is sufficiently alive to the danger, and very anxious to avert it; there is plenty of enthusiasm; there are cries of 'Viva,' and illuminations, and patriotic songs, and feasts everywhere; but that which is wanting is, the plain simple performance of his duty by each in his station."

There may be some, in whom the disease which novel-reading produces is taking root, to whom the following remarks by a very forcible writer on this subject may not be unprofitable:—

"Even though reminded of the necessity of intervening means, the man of imagination will often be tempted to violate their relation with ends, by permitting himself to dwell on those happy *casualties* which the prolific sorcery of his mind will promptly figure to him as the very things, if they would but occur, to accomplish his wishes at once, without the toil of a sober process. If they would occur,—and things as strange *might* happen,—he reads in the newspapers that an estate of ten thousand pounds per annum was lately adjudged to a man who was working on the road. He has even heard of people dreaming that in such a place something valuable was concealed; and that on searching or digging that place, they found an old earthen pot, full of gold and silver pieces of good King Charles the Martyr. Mr. B. was travelling by the mail coach, in which he met with a most interesting young lady, whom he had never seen before; they were mutually delighted, and were married in a few weeks. Mr. C., a man of great merit, in obscurity, was walking across a field, when Lord D., in chase of a fox, leaped over the hedge, and fell off his horse into a ditch. Mr. C., with the utmost alacrity and kind solicitude, helped his lordship out of the ditch, and recovered for him his escaped horse. The consequence was inevitable; his lordship, superior to the pride of being mortified to have been seen in a condition so unlucky for giving the impression of nobility, commenced a friendship with Mr. C., and introduced him into honourable society, and the road to fortune. A very ancient maiden lady, of large fortune, happening to be embarrassed in a crowd, a young clergyman offered her his arm, and politely attended her home; his attention so captivated her, that she bequeathed to him, soon after, her whole estate, though she had many poor relations.

"That class of fictitious works called *novels*, though much more like real life than the romances which preceded them (and which now, with some alterations, partly come into vogue again), is yet full of these lucky incidents and adventures, which are introduced as the chief means toward the ultimate success. A young man, without a fortune for instance, is precluded from making his addresses to a young female in a superior situation, whom he believes not indifferent to him, until he can approach her with such worldly advantages as it might not be imprudent or degrading for her to accept. Now how is this to be accomplished? Why, I suppose, by the exertion of his talents in some fair and practicable department; and, perhaps, the lady, besides, will generously abdicate, for his sake, some of the trappings and luxuries of rank. You really suppose this is the plan? I am sorry you have so much less genius than a novel-writer. This young man has an uncle, who has been absent a long time, nobody knew where, except the young man's lucky stars. During his absence, the old uncle has gained a large fortune with which he returns to his native land, at a time most opportune for every one but a highwayman, who attacks him in a road through a wood, but is frightened away by the young hero, who happens to come there at the instant to rescue and recognize his uncle, and to be, in return, recognised and made the heir to as many thousands as the lady or her family could wish.

"Now, what is the intended impression of all this on the reader's mind? Is he to think it very *likely* that *he* too has some old uncle, or acquaintance, at least, returning with a ship-load of wealth from the East Indies; and very *desirable* that the highwayman should make one such attempt more; and very *certain* that in that case he shall be there in the nick of time, to catch all that fortune sends? One's indignation is excited at the immoral tendency of such lessons to young readers, who are thus taught to regard all sober regular plans for compassing an object with disgust or despondency, foolish enough to expect them, and to be melancholy when they find they may expect them in vain."

I have been led, in the preceding observations, something further than I intended; for I have yet to speak of the rules which promote health of mind. I propose to group them together under two heads; the first, self-control, the second, intellectual occupation.

"How," says Foster, "while called to the contemplations which absorb the spirits of Heaven, could you be so patient of the task of counting the flies of a summer's day?"

I. Of Self-Control.

"It conduceth unto long life," says Lord Bacon, "and to the more placid motion of the spirits, which thereby do less prey and consume the juice of the body; either that men's actions be free and voluntary, that nothing be done *invitâ Minervâ*, but *secundum genium;* or, on the other side, that the actions of men be full of regulations and commands within themselves; for then the victory and performing of the command giveth a good disposition to the spirits, especially if there be a proceeding from degree to degree; for then the victory is the greater. An example of the former of these is in a country life; and of the latter, in monks and philosophers, and such as do continually enjoin themselves."

In the passage which I have quoted, Lord Bacon supposes the mind to be capable of reaching, by degrees, such self-discipline as to control the impulses, which would divert it from the course it most approves. How is this power of self-discipline to be cultivated, or what does it mean? Every one has a certain consciousness of freedom of deliberation, election, willing; every one blames himself when he has done wrong; and finds excuse for others in the strength of the temptations to which they have yielded. The power of willing what our judgment approves, how is it to be strengthened? Is it to be trained and encouraged as an original and active principle of our nature, or it is rather to be sought as the passive effect of the operation of other elements?

I believe the safest practical morality to be that of the necessitarian theory; whatever one's inward conviction of our free-will and liberty of action, (*and no one ever divested himself of the persuasion that he was a free agent*,) the safest rules I believe to be such as would be efficient, if there were no free-will. The practical value of such rules is evident from this consideration: If they can compel a creature of necessity to virtue, *à fortiori*, they will assist a free agent already half-disposed to it.

The following story, which may be presumed to be an ingenious fiction, amusingly shows how even the adoption of the necessitarian theory would carry with it no persuasion of an exemption from responsibility to human laws. A gentleman, so the story runs, was used at his own table to discuss and to advocate the theory of necessity, which appeared so satisfactory to a lad who waited, that he stole some plate, on the presumption that he could not help it, and, therefore, could not be blamed for it. His master, however, detecting the theft, proceeded to chastise the boy; who defended himself by protesting that he was blameless upon his master's favourite theory,—that he had learned from him that he had no liberty of choice, and that the robbery he had committed was upon compulsion. His master, however, proceeded with the punishment he had commenced, observing, that the lad's views were perfectly correct; but that he, his master, acting under a similar necessity, could not help flogging him, for the social wrong which he had committed. In the case supposed, the boy, we may presume, must logically have admitted his master's right to punish to be equal to his own to do wrong.

The practical rule for the cultivation of self-control, is, not to seek after mental independence, but to divest ourselves, as speedily as possible, of all that looks like liberty of choice, submitting ourselves with implicit obedience vassals to morality and religion.

Practically, self-control is not to be considered as an improved free-agency. It is not the power of doing (or not doing) what, on consideration, we approve, or condemn. It is not the endeavour to become master of oneself, reserving the power of afterwards selecting one's course of thought and action. Such an expectation is visionary and delusive. Rational self-control is founded on and to be obtained by the adoptino of rules of conduct,—from a perception of their moral rectitude, and reverence for the sanctity of religion,—which, acquiring the force of habit, shall render the desertion of our duties abhorrent to our nature.

In human laws and social government, the proclivity of human nature to error has to be so truly measured, that the punishments menaced against irregularity and vice may exactly counterpoise the disposition to wrong, while the prospects held out of honourable reward equally encourage to virtue.

In the education of children, motives and habits should, from the earliest years, be accumulated around them, gradually to wall in, as it were, that straight and narrow path in which their duty lies.

In that self-education which is, or ought to be, the most important object of life, it should be our constant study to shun the slightest deviations from the standard of right, which are steps towards vice, and to strengthen around us habits of moral discipline.

All our duties, moral and divine, are contained under five great principles, in respect to which our study should be *to have no choice*, but to yield an absolute obedience to their dictates: these are Veracity, Honesty, Justice, Charity, Piety.

Veracity.—The practice and opinions of the world in reference to truth are full of anomalies.

A child believes everything that is told to it; but all children, probably, unless brought up with the utmost caution, would pervert truth under fear of the consequences of declaring it. The baser materials of society are in the same condition; they are constantly being deceived, and deceiving. Upon this ground it has been bitterly said, that speech was given to man to enable him to disguise truth. It is singular, again, but certain, that falsehoods are more easily received and admitted by the world than truths if they are novel: the reason may be this; a new truth is generally improbable, or it would have been discovered before,—whereas, falsehood is framed of circumstances and for occasions, which render it likely of belief. In the affairs and judgments of men in all ranks, falsehood, again, is generally mixed with truth. As gold is not turned to the purposes of life without alloy, neither is truth. The merchant often maintains his credit by fictitious representations of his circumstances; the physician cheers his patient's spirits by representing his case as less desperate than it is; and for the purposes of justice, it is practically found that the best way of coming at truth is to engage an advocate on each side to colour his case as unfairly as art and ingenuity and the suppression of facts can effect.

It is not less remarkable that even in the Decalogue falsehood viewed abstractedly is not forbidden; in the Divine commandments there is no ordinance against it, except in connexion with injustice. "Thou shalt not bear false witness against thy neighbour," —a striking proof that the revelation which God made through Moses, in the Old Testament, was purely practical, and for the times in which His law was promulgated. Men need not, therefore, look in the Old Testament for *physical science*,— when, *in morals*, the Almighty only then declared that which was suited to and required by the early and rude state of the Jewish people, in whom it was His will temporarily to preserve the light of true religion.

What, then, is the value of veracity? Without veracity there would be no faith among men, nothing certain beyond one's own experience; knowledge would be a blank. To lower the standard of veracity is to depreciate the currency, throughout the world, of science, philosophy, morality, religion. He who disregards the sacred obligation of truth, sinks in his own esteem, and deservedly becomes the object of general scorn and contempt.

Honesty.—Honesty is the recognition of the principle of property. It is remarkable that animals have this idea in its simplest form: what they are in occupation of, they resist the abstraction of. Their master's property, again, they know and defend. In the latter instance they seem to exhibit the idea of property, beyond immediate occupation.

But they have no idea of transference of property, or of exchange and barter*.

The origin of property in the present state of the civilized world is labour. The means by which originally possession of property began, must, to a large extent, have been simple occupation, attended often by fraud and violence. Time, however, has sanctioned these appropriations, which it would be vain and mischievous to seek to disturb.

When we look around society, and see the tremendous disparity of conditions, depending upon property, the impression spontaneously arises, that this must be contrary to nature. A little reflection, however, shows that it is in order. Inequality of condition is natural to our race. Conceive all property temporarily equalized; how little time would elapse before the most industrious would accumulate what the idle would waste. Conceive again all property to be by human laws equalized permanently; civilization would be at an end: the industrious would not work to support the idle.

Justice.—"The word Justice," observes Mr. Stewart, "in its most extensive signification, denotes that disposition which leads us, in cases where our own temper, or passions, or interests, are concerned, to determine and to act without being biassed by partial considerations." No quality is more esteemed among mankind that the present; so difficult is it to avoid errrors of judgment even when the intention is good, where the passions or the interests are concerned. Practically there is the simple law, "Do unto others as you would be done by,"—which, directing you to place yourself in the position of the opposite party, will generally guide you to a right conclusion. Candour is the application of justice to the ordinary commerce of life.

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* It is Adam Smith who observes that no one ever saw a dog truck bones with another dog.

Perhaps nothing more captivates the imagination than the exercise of justice by one in possession of absolute power.

During the French expedition to Egypt, the following incident occurred, which is the more striking, as he who figured to advantage in it, became afterwards notorious for his disregard of this virtue.

"A tribe of roving Arabs had slain a peasant, and Bonaparte had given directions to search out and punish the murderers. One of his oriental councillors laughed at the zeal which the general manifested on so slight a cause. 'What have you to do with the death of this Fellah, Sultan Kebir?' said he, ironically: 'was he your kinsman?' 'He was more,' said Napoleon, 'he was one for whose safety I am accountable to God, who placed him under my government.'

"'He speaks like an inspired person,' exclaimed the sheiks, struck with the beauty of the principle, which they habitually violated."

Charity.—The sentiment and practice of benevolence is given us seemingly to temper the inequality of fortune; at the same time that in the smaller duties to which it extends, it diffuses itself like oil upon the waves, and soothes and allays the ruffled surface which the tumult of conflicting interests would else occasion. He who is strictly honest, and whose exertions have been defeated, not by his own imprudence, but by the uncontrollable course of accident, has a claim which is never denied, on the benevolence of his more fortunate fellow-creatures. The happiness of social life depends upon the sedulous *cultivation* of the same spirit in trifles;—to forgive is often more difficult than to give. Gentleness and suavity of disposition, and kindliness of temper, leading us to live in charity with all, essentally promote happiness.

Piety.—In his contribution to Captain Franklin's "Narrative," Dr. Richardson observes, speaking of the time of their greatest hardship and peril:

"Through the extreme kindness and forethought of a lady, the party, previously to leaving London, had been furnished with a small collection of religious books, of which we still retained two or three of the most portable, and they proved of incalculable benefit to us. We read portions of them to each other as we lay in bed, in addition to the morning and evening service, and found that they inspired us on each perusal with so strong a sense of the omnipresence of a beneficent God, that our situation, even in these wilds, appeared no longer destitute; and we conversed not only with calmness, but with cheerfulness, detailing with unrestrained confidence the past events of our lives, and dwelling with hope on our future prospects. Had my poor friend been spared to revisit his native land, I should look back to this period with unalloyed delight."

There are occasions, like that on which Dr. Richardson so sensibly experienced the comforts of religion, which, sooner or later, fall to the lot of all, and in which all seek its sustaining influence:—in the bereavement of those whom we have loved, on the bed of sickness, in overwhelming earthly calamity, the creature seeks his Creator.

Times, again, and seasons, constantly recur, in which external Nature wakes the same thoughts within us:—in the stillness of the night,—in the silent early morning,—when solitarily gazing from some eminence over the illimitable ocean,—in the depths of forests,—a feeling of awe creeps over the frame: man is alone with his God.

It is possible in these scenes to abstract their intrinsic deep and moving influence, from one's knowledge and belief, and to feel within us the primitive mysterious impulse to acknowledge the unseen and all-pervading Power.

But what are the elements which reflection and knowledge add to this first impulse, to constitute the religion of a rational being? What is the interval between the swell of the surge and music of waters, echoing in the cave where the untutored Indian bends to Nature's God,—and the pealing organ and choral voices, rolling their flood of harmony through the stately temples which Faith has dedicated to Heaven?

1. Rational man, examining the natural world, discovers in everything the most striking suitableness of structure and disposition to important objects, that are *so* compassed and attained,—a wonderful harmony and reciprocal fitness, which it is analogically impossible to refer to an accidental concourse of atoms. He is compelled, by the laws of his belief, to attribute the existence of the world, such as he views it, to an Intelligent Cause,—to the operation of infinite power guided by sovereign wisdom.

2. Examining the constitution of his mind, he finds an unalterable disposition to venerate truth and justice. We analogically deem *that excellence* to be part of *His* Nature who gave the approbation of virtue such deep root in our bosoms; and we construe those inherent dispositions as the moral law of God written in our hearts.

3. Looking around the world, we see that happiness is its prevailing character; that enjoyment and life are primarily blended in the dispensations of nature. Nay, that where pain and bodily distress ensue, the intervals of suffering convey new sensations of delight unknown to the more fortunate. We acknowledge the beneficence of God to be the natural subject of thanksgiving and humble prayer.

4. We yearn to approach His nature,—to reach the immediate throne of God,—to receive his declared will and purposes by us. Has He made such a revelation? It was hoped for,—it was prophesied,—then came the accomplishment of prophecy,—the promise and means of redemption: they have been received by the wise and the good. The dawn of natural religion was long and uncertain; at length the mists of superstition and error dispersed; and the sun of Christianity shed its benign influence on the children of our planet.

In the section which remains to complete this slight volume, I proposed to advert to intellectual cultivation and the active pursuits of life. But the objects which I have last touched upon, have, in some remarkable examples, superseded all others, and have found sufficient and exclusively absorbing occupation for the strongest minds. Of this, perhaps, the most remarkable instance is that of the philanthropist Howard, in whom a pursuit exclusively moral was united with a force of character and determination never surpassed,—adequate to, and perhaps even more imposing than his beneficent purposes.

"The energy of his determination was so great, that if, instead of being habitual, it had been shown only for a short time on particular occasions, it would have appeared a vehement impetuosity; but by being unintermitted, it had an equability of manner which scarcely appeared to exceed the tone of a calm constancy, it was so totally the reverse of anything like turbulence or agitation. It was the calmness of an intensity kept uniform, by the nature of the human mind forbidding it to be more, and by the character of the individual forbidding it to be less. The habitual passion of his mind was a measure of feeling almost equal to the temporary extremes and paroxysms of common minds: as a great river, in its customary state, is equal to a small or moderate one when swollen to a torrent.

"The moment of finishing his plans in deliberation, and commencing them in action, was the same. I wonder what must have been the amount of that bribe, in emolument or pleasure, that would have detained him a week inactive after their final adjustment. The law which carries water down a declivity, was not more unconquerable and invariable than the determination of his feelings toward the main object. The importance of this object held his faculties in a state of excitement which was too rigid to be affected by lighter interests, and on which, therefore, the beauties of nature and of art had no power. He had no leisure feeling which he could spare to be diverted among the innumerable varieties of the extensive scene which he traversed; all his subordinate feelings lost their separate existence and operation, by falling into the grand one. There have not been wanting trivial minds, to mark this as a fault in his character. But the mere men of taste ought to be silent respecting such a man as Howard; he is above their sphere of judgment. The invisible spirits, who fulfil their commission of philanthropy among mortals, do not care about pictures, statues, and sumptuous buildings; and no more did he, when the time in which he must have inspected and admired them, would have been taken from the work to which he had consecrated his life. The curiosity which he might feel, was reduced to wait till the hour should arrive, when its gratification should be presented by conscience, which kept a scrupulous charge of all his time, as the most sacred duty of that hour. If he was still at every hour, when it came, fated to feel the attractions of the fine arts but the second claim, they might be sure of their revenge; for no other man will ever visit Rome under such a despotic consciousness of duty, as to refuse himself time for surveying the magnificence of its ruins. Such a sin against taste is very far beyond the reach of common saintship to commit. It implied an inconceivable severity of conviction, that he had *one thing to do*, and that he who would do some great thing in this short life, must apply himself to the work with such a concentration of his forces, as, to idle spectators, who live only to amuse themselves, looks like insanity.

His attention was so strongly and tenaciously fixed on his object, that even at the greatest distance, as the Egyptian pyramids to travellers, it appeared to him with a luminous distinctness, as if it had been nigh, and beguiled the toilsome length of labour and enterprise by which he was to reach it. It was so conspicuous before him, that not a step deviated from the direction, and every movement and every day was an approximation. As his method referred everything he did and thought to the end, and as his exertion did not relax for a moment, he made the trial, so seldom made, what is the utmost effect which may be granted to the last possible efforts of a human agent: and, therefore, what he did not accomplish, he might conclude to be placed beyond the sphere of mortal activity, and calmly leave to the immediate disposal of Omnipotence."

II. OF INTELLECTUAL CULTURE AND PRACTICAL EXERTION.

BESIDES their use in forming our moral nature, the intellectual powers require to be cultivated for the ordinary business of life, on a reasonable occupation in which, health of mind as much depends, and much in the same way, as health of body on habitual exercise.

Intellectual culture presents two aspects; it may be considered both in the stage of preparation, and in its results; in the process of tuition, and in the conduct of affairs.

The advantages of education are commonly undervalued. We see men, who, by sheer force of native talent, and without tutorage or instruction, raise themselves to eminent success in various walks, and not merely in the course of their business, but in their judgment of general affairs, exhibit enlarged and liberal minds, and express their thoughts with that correctness of language and logical arrangement, which we had expected to find the exclusive offspring of a liberal education. In considering these instances, we are apt to overlook the advantages which the parties have enjoyed in living in a highly-educated community, the current literature of which they have access to, and profit by, at the same time that they are progressively winning their way into its higher circles. Every man in

England, whose industry and abilities raise him above the condition of a mere labourer, breathes an atmosphere of knowledge and reflection, which he may turn to the profit of his intellectual assimilation. It is of course no argument against high education, but greatly in its favour, that its advantages are thus widely diffused beyond its immediate possessor.

The objects of intellectual education are twofold,—to give the habit of study, and an introduction to every variety of knowledge.

With reference to the latter point, the studies of youth may be divided into three kinds, the mathematical, natural philosophy, language.

As the first moral habit is veracity, so the first intellectual aim is the recognition and discovery of truth. Geometry and the method of analysis, experimental and natural philosophy, language with the study of history, present to the mind the various forms of evidence, the demonstrative, the inductive, and that of testimony.

But I feel that I am now going beyond my limits; that to say little upon these topics is folly, and to discuss them adequately beyond my leisure and ability. I shall therefore conclude the present treatise by giving examples instead of rules, in masterly portraits of two of the most noble spirits that have adorned our history.

The first is the character of an English noble-man, whom civil discord drew from literary and philosophic retirement to shed his blood in the field.

The second is the character of William Pitt, drawn by the Marquess Wellesley.

1. I pass over Lord Clarendon's account of Lord Falkland's early life, which has less interest than the extract which follows.

"With these advantages (of rank and a good estate) he had one great disadvantage, (which, in the first entrance into the world, is attended with too much prejudice,) in his person and presence, which was in no degree attracting or promising.

"His stature was low, and smaller than most men; his motion not graceful; and his aspect so far from inviting, that it had something in it of simplicity; and his voice, the worst of the three, and so untuned, that, instead of reconciling, it offended the ear, so that nobody could have expected music from that tongue; and sure no man was less beholden to nature for its recommendation into the world; but no man sooner, or more, disappointed this general and customary prejudice; that little person and small stature was quickly found to contain a great heart, a courage so keen, and a nature so fearless, that no composition of the strongest limbs, and most harmonious and proportioned presence and strength, ever more disposed any man to the greatest enterprise; it being his greatest weakness to be too solicitous for such adventures; and that untuned tongue, and voice, easily discovered itself to be supplied, and governed, by a mind and understanding so excellent, that the art and weight of all he said, carried another kind of lustre and admiration in it, and even another kind of acceptation from the persons present, than any ornament of delivery could reasonably promise itself, or is usually attended with; and his disposition and nature were so gentle and obliging, so much delighted in courtesy, kindness, and generosity, that all mankind could not but admire and love him.

"Though his father's death brought no other convenience to him but a title to redeem an estate, mortgaged for as much as it was worth, and for which he was compelled to sell a finer seat of his own; yet it imposed a burden upon him of the title of a viscount, and an increase of expense, in which he was not in his nature too provident or restrained. Having naturally such a generosity and bounty in him, that he seemed to have his estate in trust for all worthy persons who stood in want of supplies and encouragement, as Ben Jonson, and many others of that time, whose fortunes required, and whose spirits made them superior to, ordinary obligations, which yet they were contented to receive from him, because his bounties were so generously distributed, and so much without vanity and ostentation, that except from those few persons from whom he sometimes received the characters of fit objects for his benefits, or whom he entrusted, for the more secret dividing them to them, he did all he could that the persons themselves who received them should not know from what fountain they flowed; and when that could not be concealed, he sustained any acknowledgment from the persons obliged with so much trouble, that they might well perceive that he was even ashamed of the little he had given, and to receive so large a recompense for it.

" As soon as he had finished all those transactions which the death of his father had made necessary to be done, he retired again to his country life, and to his severe course of study, which was very delightful to him, as soon as he was engaged in it: but he was wont to say, that he never found reluctancy in anything he resolved to do, but in his quitting *London*, and departing from the conversation of those he enjoyed there, which was in some degree preserved and continued by frequent letters, and often visits, which were made by his friends from thence, whilst he continued wedded to the country; and which were so grateful to him, that, during their stay with him, he looked upon no book, except their very conversation made an appeal to some book; and truly his whole conversation was one continued *convivium philosophicum*, or *convivium theologium*, enlivened and refreshed with all the facetiousness of wit, and good humour, and pleasantness of discourse, which made the gravity of the argument itself (whatever it was) very delectable. His house where he usually resided (Tew, or Burford, in Oxfordshire,) being within ten or twelve miles of the university, looked like the university itself, by the company that was always found there. There were Dr. Sheldon, Dr. Morley, Dr. Hammond, Dr. Earles, Mr. Chillingworth, and, indeed, all men of eminent parts and faculties in Oxford, besides those who resorted thither from London, who all found their lodgings there as ready as in the colleges, nor did the lord of the house know of their coming, or going, nor who were in his house, till he came to dinner, or supper, where all still met, otherwise there was no troublesome ceremony, or constraint, to forbid men to come to the house, or to make them weary of staying there; so that many came thither to study in a better air, finding all the books they could desire in his library, and all the persons together whose company they could wish, and not find in any other society. Here Mr. Chillingworth wrote, and formed, and modelled his excellent book against the learned Jesuit, Mr. Nott, after frequent debates upon the most important particulars; in many of which he suffered himself to be overruled by the judgment of his friends, though in others he still adhered to his own fancy, which was sceptical enough even in the highest points.

"In this happy and delightful conversation and restraint, he remained in the country many years; and until he had made so prodigious a progress in learning, that there were very few classic authors in the *Greek* or *Latin* tongue, that he had not read with great exactness; he had read all the *Greek* and *Latin* fathers; all the most allowed and authentic ecclesiastical writers; and all the councils, with wonderful care and observation; for in religion he thought too careful and too curious an enquiry could not be made, amongst those whose purity was not questioned, and whose authority was constantly and confidently urged, by men who were farthest from being of one mind amongst themselves, and for the mutual support of their several opinions, in which they most contradict each other; and in all those controversies, he had so dispassioned a consideration, such a candour in his nature, and so profound a charity in his conscience, that in those points in which he was in his own judgment most clear, he never thought the worse, or in any degree declined the familiarity, of those who were of another mind, which, without question, is an excellent temper for the propagation and advancement of Christianity. With these advantages of industry, he had a memory retentive of all that he had ever read, and an understanding and judgment to apply it seasonably and appositely with the most dexterity and address, and the least pedantry and affectation, that ever man, who knew so much, was possessed with, of what quality soever.

" But all his parts, abilities, and faculties, by art and industry, were not to be valued, or mentioned, in comparison of his most accomplished mind and manners; his gentleness and affability was so transcendent and obliging, that it drew reverence, and some kind of compliance, from the roughest, and most unpolished, and stubborn constitutions, and made them of another temper in debate in his presence, than they were in other places; he was in his nature so severe a lover of justice, and so precise a lover of truth, that he was superior to all possible temptations for the violation of either; indeed, so rigid an exactor of perfection, in all those things which seemed but to border upon either of them, and by the common practice of men were not thought to border upon either, that many who knew him very well, and loved, and admired his virtue, (as all who did know him must love and admire it,) did believe that he was of a temper, and composition, fitter to live *in Republicâ Platonis* than in *Fæce Romuli;* but this rigidness was only exercised towards himself; towards his friend's infirmities no man was more indulgent. In his conversation, which was the most cheerful and pleasant that can be imagined, though he was young (for all I have yet spoken of him doth not exceed his age of twenty-five or twenty-six years), and of great gaiety in his humour, with a flowing delightfulness of language, he had so chaste a tongue and ear, that there was never known a profane or loose word to fall from him, nor, in truth, in his company; the integrity and cleanliness of the wit of that time not exercising itself in that license before persons for whom they had any esteem."

2. *Letter of the Marquess Wellesley, describing the Character of William Pitt.*

. . . . . . "In attempting to convey my recollections of Mr. Pitt's character in private society, I cannot separate those qualities which raised him to the highest public eminence from those which rendered him a most amiable companion. Both proceeded from the same origin, and both were happily blended in the noble structure of his temper and disposition.

"Mr. Pitt's mind was naturally inaccessible to any approach of dark, or low, or ignoble passion. His commanding genius and magnanimous spirit were well destined to move in a region far above the reach of those jealousies, and suspicions, and animosities, which disturb the course of ordinary life. Under the eye of his illustrious father he had received that 'complete and generous education which fits a man to perform justly, skilfully, and magnanimously, all the offices, both private and public, of peace and war.'

"Such an education, acting on such a natural disposition, not only qualified him to adorn the most elevated stations in the counsels of his country, but furnished him with abundant resources to sustain the tranquillity and cheerfulness of his mind.

"He had received regular and systematic instruction in the principles of the Christian religion, and in the doctrine and discipline of the Church of England, and in every branch of ecclesiastical history. His knowledge in those subjects was accurate and extensive. He was completely armed against all sceptical assaults, as well as against all fanatical illusion; and, in truth, he was not merely a faithful and dutiful, but a learned member of our Established Church; to which he was most sincerely attached, with the most charitable indulgence for all dissenting sects.

"No doubt can exist in any rational mind that this early and firm settlement of his religious opinions and principles, was a main cause of that cheerful equanimity which formed the great characteristic of his social intercourse, and which was never affected by adversities or troubles.

"He was perfectly accomplished in classical literature, both Latin and Greek. The accuracy and strength of his memory surpassed every example which I have observed; but the intrinsic vigour of his understanding carried him far beyond the mere recollection of the great models of antiquity in oratory, poetry, history, and philosophy. He had drawn their essence into his own thoughts and language; and, with astonishing facility, he applied the whole spirit of ancient learning to his daily use.

"Those studies were his constant delight and resort; at Holwood, in Kent, (his favourite residence,) and at Walmer Castle, his apartments were strewed with Latin and Greek classics; and his conversation with those friends who delighted in similar studies, frequently turned on that most attractive branch of literature; but he was so adverse to pedantry, or affectation of superior knowledge, that he carefully abstained from such topics in the presence of those who could not take pleasure in them. In these pursuits, his constant and congenial companion was Lord Grenville, who has often declared to me that Mr. Pitt was the best Greek scholar he ever conversed with. Mr. Pitt was also as complete a master of all English literature as he was undoubtedly of the English language. I have dwelt on this branch of Mr. Pitt's accomplishments, because I know not any source from which more salutary assistance can be derived, to chase from the spirits those clouds and vapours which infest vacant minds, and, by self-weariness, render retirement melancholy and intolerable.

" But Mr. Pitt amply possessed every resource which could enliven retirement. No person had a more exquisite sense of the beauties of the country. He took the greatest delight in his residence at Holwood, which he enlarged and improved (it may be truly said) with his own hands. Often have I seen him working in his woods and gardens with his labourers, for whole days together, undergoing considerable bodily fatigue, and with so much eagerness and assiduity, that you would suppose the cultivation of his villa to be the principal occupation of his life.

" He was very fond of exercise on horseback, and when in the country frequently joined the hounds of his neighbourhood, both at Holwood and Walmer Castle.

" At the latter place he lived most hospitably, entertaining all his neighbours, as well as the officers of the neighbouring garrisons, and of the ships in the Downs; and he was most attentive to his duties of Lord Warden of the Cinque Ports, which called him frequently to Dover, and sometimes to other ports.

" But in all places, and at all times, his constant delight was society. There he shone with a degree of calm and steady lustre which often astonished me more than his most splendid efforts in Parliament. His manners were perfectly plain, without any affectation: not only was he without presumption, or arrogance, or any air of authority, but he seemed utterly unconscious of his own superiority, and much more disposed to listen than to talk. He never betrayed any symptom of anxiety to usurp the lead, or to display his own powers, but rather inclined to draw forth others, and to take merely an equal share in the general conversation: then he plunged heedlessly into the mirth of the hour, with no other care than to promote the general good-humour and happiness of the company. His wit was quick and ready, but it was rather lively than sharp, and never envenomed with the least taint of malignity; so that, instead of exciting admiration or terror, it was an additional ingredient in the common enjoyment. He was endowed, beyond any man of his time whom I knew, with a gay heart and a social spirit. With these qualities, he was the life and soul of his own society; his appearance dispelled all care; his brow was never clouded, even in the severest public trials; and joy, and hope, and confidence, beamed from his countenance in every crisis of difficulty and danger.

"He was a most affectionate, indulgent, and benevolent friend, and so easy of access, that all his acquaintance in any embarrassment would rather resort to him for advice than to any person who might be supposed to have more leisure. His heart was always at leisure to receive the communications of his friends, and always open to give the best advice in the most gentle and pleasant manner.

"It is a melancholy but a grateful task to pay this tribute to the memory of my departed friend. *Aut me amor negotii suscepti fallit*,—or the character which I have endeavoured to draw is not less just and true, than it is amiable and excellent; and I cannot resist the conclusion that a pure and clear conscience must have been the original source of such uniform cheerfulness and gaiety of spirit. The truth which I have asserted, I possessed ample means of knowing. From the year 1783, to 1797, I lived in habits of the most confidential friendship with Mr. Pitt.

"In the year 1797, I was appointed Governor-General of India, and in the month of September in that year, I went to Walmer Castle to meet Mr. Pitt and Mr. Dundas, and to receive my last instructions. I found Mr. Pitt in the highest spirits, entertaining officers and country gentlemen with his usual hospitality. Amongst others, Admiral Duncan was his constant and favourite guest. His fleet was then in the Downs, preparing for the memorable victory of Camperdown. The Admiral was a lively and jovial companion, and seemed to be quite delighted with Mr. Pitt's society. I embarked for India early in the month of November, 1797, and I returned to England in 1806.

* * * * *

"On my arrival in England, in January, 1806, Mr. Pitt was at Bath; I wrote to him, and I received from him a very kind invitation to meet him at Putney-hill. I met him accordingly in the second week in January, and I was received by him with his usual kindness and good-humour. His spirits appeared to be as high as I had ever seen them, and his understanding quite as vigorous and clear.

"Amongst other topics, he told me, with great kindness and feeling, that since he had seen me, he had been happy to become acquainted with my brother Arthur, of whom he spoke in the warmest terms of commendation. He said, 'I never met any military officer with whom it was so satisfactory to converse. He states every difficulty before he undertakes any service, but none after he has undertaken it.'

"But, notwithstanding Mr. Pitt's kindness and cheerfulness, I saw that the hand of death was fixed upon him. This melancholy truth was not known nor believed by either his friends or opponents. In the number of the latter, to my deep affliction, I found my highly respected and esteemed friend, Lord Grenville; and I collected that measures of the utmost hostility to Mr. Pitt were to be proposed, in both houses, at the meeting of Parliament.

"I warned Lord Grenville of Mr. Pitt's approaching death. He received the fatal intelligence with the utmost feeling, in an agony of tears, and immediately determined that all hostility in Parliament should be suspended. Mr. Pitt's death soon followed*.

"If any additional evidence were required of the excellence of his social character, it would be found abundantly in the deep sorrow of a most numerous class of independent, honest, and sincerely attached friends, who wept over the loss of his benevolent and affectionate temper and disposition, with a degree of heartfelt grief which no political sentiment could produce. Many of these were assembled at the sad ceremony of his funeral; with them I paid the last offices to his honoured memory. We attended him to Westminster Abbey. There the grave of his illustrious father was opened to receive him, and we saw his remains deposited on the coffin of his venerated parent. What grave contains such a father, and such a son? What sepulchre embosoms the remains of so much human excellence and glory†?"

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* Parliament met on the 21st, Mr. Pitt died on the 23rd of January, 1806.

† *Quarterly Review,* October, 1836.

THE END.

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